Jamsetji Jijibhai Hospital, Bombay.

HOSPITAL REPORTS

BY

THE MEDICAL & PROFESSORIAL STAFF

OF THE JAMSETJI JIJIBHAI HOSPITAL AND GRANT MEDICAL COLLEGE.

VOL. I.

Bombay:
PRINTED AT THE
EDUCATION SOCIETY'S STEAM PRESS, BYCULLA.

1892.

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PREFACE.

THIS small volume is a first attempt to form a permanent yearly record of selections from the work done by the Staff of the J. J. Hospital and Grant Medical College. It is obvious that in our great combined clinical and educational institution, which embraces so wide a field for observation, and which affords so many varied opportunities for the acquisition of scientific knowledge, a large amount of material and experience in Medicine, Surgery, Pathology, Medical Jurisprudence, and other sciences must be gathered annually. It is true also that, for want of such a record, no inconsiderable portion of this material and experience, some of which might possibly be of value, remains unutilised and unproductive, as far at least as members of the Medical Profession in Bombay, not connected with the Hospital, are concerned. It means, practically, so much useful information running to waste. The old Medical and Physical Society, during its occasional periods of revival, prevented this waste to some extent, and helped us to supply the want; though in a more or less imperfect and unsatisfactory manner. Besides the numerous minor difficulties which stood in the way, there was also the primary one, due to causes not necessary to mention here, of preserving a Presidency Medical Society in a condition of unbroken, vigorous existence: while at the same time the "Transactions" of such a Society must, as a rule, exclude from their pages many contributions which, although worthy of record, find usually a more appropriate resting-place in a volume of "Hospital Reports." Here, in a few words, are the reasons which account for the present compilation. In a project like this certain omissions and shortcomings are unavoidable at the start. These will, it is hoped, be rectified in succeeding numbers, assuming, of course, that our venture takes root—and lives. The chief obstacle to its continued vitality in the future is, it may be mentioned, the want of sufficient leisure on the part both of the contributors and of the editor.

W. G.

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The Progress of Surgery in Bombay during the last Twenty Years.*

By Brigade Surgeon W. Gray, Principal, and Professor of Surgery, Grant Medical College, and Senior Surgeon, J. J. Hospital.

On this the second occasion since the new departure, I have again undertaken the responsibility of delivering the annual Introductory Address. I do so for various reasons not necessary to mention. Next year, however, I shall expect one of my colleagues to charge himself with this duty. The subject of my first address was, as you will recollect, the important one of Medical Education, and I am glad to know that what I then said was so well received. It had been my intention to pursue a branch of the same subject this year, but on thinking the matter over, I came to the conclusion that it was possible to have too much of it, and that something totally different would be more acceptable. I have therefore chosen as the text of my discourse to-day the Progress of Surgery in Bombay during the last twenty years. I propose to deal with the subject chiefly in its operative aspects.

The principal reason that has led me to take up this as an appropriate subject for an address to students and the profession is a conviction, formed long since, that Surgery, as a branch of medical science, does not receive the recognition it merits at the hands of our local practitioners: that there is a strong tendency to neglect or thrust it aside in favour of medicine. There are exceptions of course, which I will notice presently; but that this tendency, generally speaking, really does exist there can be no question. When I bring the matter to the notice of practitioners, the most usual reply is that they do not care for surgery. In surgical consulting practice, too, I have frequently inquired why I have been called to give advice in a common and comparatively trivial case, which the most ordinary practitioner should himself be competent to deal with, but have received

* An Introductory Address delivered at the opening of the Winter Session 1890-91.

no satisfactory answer. Do we ever hear of important surgical operations being performed by the City practitioners? I certainly never hear of any. Or are such cases ever brought before the societies? We are all aware, no doubt, of one operating surgeon amongst us, but it is absurd to suppose that he is able, single-handed, to attend to the whole of the practical surgery which must be needed by the population of so large a city as ours. Pure consulting surgeons, who see only those cases they are called to by general practitioners, perform, as I can testify from experience, but a very insignificant amount of operative surgery in private practice in Bombay. The general practitioner, in extensive practice should, under the circumstances, have an entirely different story to tell. I ask then, what becomes of the numerous cases requiring operation which must exist in a population like ours and numbering at least a million? It is usual for many cases from the country also to come to Bombay for surgical advice: what becomes of them? I do not here allude to specialists like ophthalmic surgeons. Who treats, for example, tumours, hernias, diseased joints, intestinal obstruction, deformities, calculus? One operating surgeon cannot, as I say, attend to all. The general practitioners, if all they tell me is correct, have little to do with such cases, and the consulting surgeons equally little. I have often asked these questions, and have been more than once assured by men whose information and good faith there could be no reason to doubt, that the cases either fall into the hands of quacks, or are simply left to take care of themselves; both eventualities meaning that many of them who might be cured by operation die from the want of it.

As Professor of Surgery in this College, it has always been my chief aim, next to thorough instruction, to make surgery popular amongst students and young practitioners. Whether my efforts have had any success, it still, I am afriaid, remains to be seen. No pains are spared to make our students familiar with the procedures of operative surgery. They not only go through a complete practical course on the dead body, but they are severely tested in it at the final examination; which is

more than can be said of the candidates for the membership of the London College of Surgeons. Another practice followed here is that of allowing the senior students to perform, under supervision, most of the simple minor operations on out-patients. I am not aware that so great an advantage and privilege as this is possessed by students elsewhere. Our students also witness, and assist at, large numbers of capital operations, so that, along with the clinical teaching and practice in the surgical wards of the hospital, they should, strictly speaking, begin work for themselves better equipped with surgical knowledge than any practitioners in the world. In spite of all this, it is only too true that when they leave College and set up as independent practitioners they throw surgery, more especially the operative side of it, to the winds and devote themselves almost exclusively to medicine. Why should this be? It is not that they are surgically incapable. On the contrary, some of our men in Government service, who happen to be placed in positions where they are, so to speak, compelled to practise operative surgery, make admirable surgeons. I need not now mention names, but more than one instance will readily occur to you. Possibly some of them would prefer to practise medicine exclusively, but the exigencies of their appointments will not permit of this; and the Surgeon-General has to be reckoned with besides. The circumstances that gave us our one operating surgeon in Bombay are familiar to many of us. I have often tormented myself to find a reason for this apparent dislike of surgery, but can arrive at no satisfactory conclusion. The observations which I have been able to make in this matter are full of curious contradictions. We have students eager to perform the minor operations on out-patients; sometimes actually contending with one another for the privilege. We have them so filled with zeal for the operative surgery class that they think nothing of remaining at work for a considerable time beyond the regulation hour; even long after College hours and during the vacation; yet, notwithstanding this show of enthusiasm, the moment they become independent practitioners, surgery is cast aside as if it were a thing of no value. I can-

not help occasionally suspecting that this surgical zeal of student life lies only on the surface. Surgery is on their lips but medicine is in their hearts. One little fact which I have frequently noticed increases this suspicion. I have never but once known a student to possess a surgical pocket-case; but they all carry stethoscopes. When I seek a reason for this, they tell me that pocket-cases are expensive and that stethoscopes are cheap. I rejoin that if they had any genuine liking for surgery, or desire for a pocket-case, they could easily discover that very inexpensive sets of the instruments necessary for a student are obtainable.

A reason, I very frequently hear assigned for this apparent indifference to surgery is that the public in general are, as a rule, most reluctant to submit to anything in the shape of operative procedure ; that they much prefer to die without it and from the want of it. No doubt, there is a good deal of truth in this view, as many of us are only too well aware; but how can it be otherwise if practitioners will not cultivate surgical knowledge and show themselves prepared and willing and courageous enough to undertake operations. The public are not slow to perceive that a practitioner regards physic with favour and surgery with disfavour ; that he sets the one far above the other. Consequently no one will have any confidence in him as an operator. What wonder is it then that surgery suffers when we have a profession who do not care to practise it, and, as a result, a public who are allowed to remain in ignorance of its value and advantages? The Bombay public require to be educated in this direction. We all know how ignorant a very large section of it is, and how backward to appreciate modern medicine and surgery. Nothing in the treatment of bodily ills appeals so much to ignorant people as successful surgery : it is a fact well-known in this country and beyond its borders. There is, therefore, all the more reason why some at least of our practitioners should cultivate the art, and thus bring home to the minds of the people what a powerful means they neglect of alleviating pain and suffering. Again, I have been many times told by practitioners that people have no confidence in

them as surgeons. How else could it be, may I ask, when these same practitioners are without confidence in themselves? That this is true to a certain extent I have more than once had proof. I have frequently been called in to superintend the operation of incising a small abscess or tapping a hydrocele. In other words, I am invited to stand by and see that the practitioner in charge of the case does his work properly. Sometimes it is the patient who insists upon my being present while such a trifling operation is performed: on other occasions it is at the desire of the medical attendant that I am there. In the one case the patient lacks confidence in his surgeon: in the other the surgeon has none in himself.

Let me offer one more explanation of this seeming indifference to surgery on the part of our graduates. I have long entertained a suspicion that certain peculiarities of race and nationality, and modes of thought and action, have their influence, to an even greater extent, perhaps, than we imagine. You all probably have some idea of what the characteristics of the Hindu philosophical system are. Englishmen, who are nothing if not practical, are accustomed to say that the professors and followers of this philosophy, and Hindus in general, are, to some extent at least, deficient in the qualities that lead to practical enterprise. I confess to holding some such opinions myself too. I believe medicine to be more adapted to the Hindu mind and temperament than surgery. Those of other races and communities, who may happen to be influenced by association with Hindu modes of thought, travel in the same groove. Many people think also, and with some show of reason, that the modern educational system which is in force in our High Schools and Arts Colleges aids in perpetuating these same modes of thought and action, or something very like them. In the present comparatively imperfect state of our knowledge as regards physiology and pathology, the uncertainties and guess work of medicine, as compared with the practical realities of surgery, tend to make the former, as far as the administration of drugs is concerned, a mere "groping in the dark" after things unseen and unknown, and a more congenial pur-

suit than the latter, to the sedentary and contemplative philosopher of India. I may sum up my thoughts in this way :— That the professional man whose hereditary habits, associations, and general training lead him to sit still and wait will, if left to himself, naturally become a physician, or rather an administrator of drugs: while the other who is less under such influences, or free from them altogether, has a natural tendency to be "up and doing," and will, if opportunity offers, probabliy apply himself either partially or wholly to surgery.

There is one curious fact which seems to lend weight to this theory of mine. If we examine the records of our graduates who are, or have been, in Government service, we shall find that nearly every one of them who has gained approbation for successful surgery is a Parsi. At present I know of but two or three exceptions. One notable instance I may perhaps be allowed to mention—Mr. T. M. Shah of Junaghar. Parsis are, as a rule, imbued with a spirit of practical energy and enterprise, so much so that they are sometimes described as the Anglo-Saxons of the East. Obstetrics, which is really a branch of surgery, is, with one or two exceptions, practised here by Parsi graduates only.

Probably, too, the blind faith of the public in the healing power of drugs, and the belief that nothing is being done to cure them unless their stomachs are kept constantly full of complex and useless mixtures, has also an influence in producing a preference for the practice of physic rather than of surgery. Few populations in the world have so great a capacity for swallowing drugs as ours, and that this propensity is indulged and encouraged to the utmost, nobody can doubt. Hospital records prove it; and so do the length and variety of the prescriptions one meets with daily, in which several drugs are given, apparently on the chance that one of them may do good. We all know, too, that the longer a prescription is, the more highly do the patient and his friends think of the prescriber. My personal experience tells me that I am, to a certain extent, unpopular with private patients, because I will not order them

as much useless medicines as they themselves think necessary. As regards hospital administration, this prodigious expenditure of drugs is the one thing I feel powerless to fight against: patients, no matter what they suffer from—even a broken leg—insist on being dosed with physic, and unless they are filled with it, they refuse to remain in hospital, because, as they say, "nothing is being done to cure them." I have received many an indignant complaint from patients about this imaginary neglect of their interests.

This very long preface forms the justification for what I have to say as regards recent progress in the science and art of surgery. My design, in this address, is to point out first, the extent to which surgery is neglected in Bombay, and the reasons, as I conceive them, for that neglect; and next, to show you what enterprise and the adoption of rational principles of treatment have done to advance surgical science, and render it a powerful weapon for the promotion of civilization and the relief of human suffering. Upon the younger members of my audience, more especially, I wish to impress the truth that indifference to a great branch of their profession is clearly a departure from the duty which, as men educated in, and accepting, Western Medical Science, it is incumbent upon them to recognise. I now proceed to place before you as fully as possible within the time at my disposal an account of the discoveries and improved methods of treatment which have, in the course of the last twenty years, completely revolutionised surgery. Both as a science and an art, its development is still rapidly progressing: so rapidly indeed, that, except under special circumstances, it is no easy matter to keep pace with the advance of knowledge and improved procedure. The change, both as regards the pathology and therapeutics of surgery, are so enormous, that it is no exaggeration to say of a man who has failed to progress, and who still follows modes of treatment learned no more than twenty years ago, that he is "fifty years behind the times."

For some years after I joined the surgical side of the J. J. Hospital in 1866, we were accustomed to congratulate ourselves on the successful results of operations, and also to say that our

record was much more favourable than that of European hospitals; and that we did not fear comparison with the best of them. We were partly right in this belief, no doubt, but we made the mistake of attributing some at least of our success to treatment. Now that I look back upon those days in the light of more recent experience, I am compelled to acknowledge that our patients got well in spite of us. If, at the present day, we deliberately followed the same modes of treatment as we did then, I have no hesitation in saying that we should often be morally guilty of something very like homicide. It was, beyond question, the favourable sanitary circumstances in which they were placed that caused our surgical patients to recover so well. Our treatment, ignorant and old-fashioned as it now appears to us, could not overcome the beneficial influences of free ventilation and clean wards. In these latter respects indeed we are, and always have been, far ahead of European hospitals. The results of that day, good as they were, we should regard as very unfavourable now. The improvement has been brought about, not by any particular alteration in general sanitation, but is wholly due to the adoption of rational methods of treatment founded on the discoveries of scientific pathological research, as well as on exact experiment and observation.

I may observe here that a spirit of practical enterprise and adventure has also had much indirect influence in producing the recent developments of surgery, more especially in England. Without such characteristics as enterprise and daring, combined as they have been with patience and perseverance under difficulties, many of the new operative procedures and modes of treatment could never have been brought so far towards perfection, nor would they have resulted in so great a saving of life and suffering. It required courage also to undertake the task of sweeping away the mist of ignorance, prejudice, and tradition which impeded the progress of scientific surgery, as well as to face the storm of obloquy with which any attempt to upset or interfere with old-fashioned and cherished beliefs was certain to be met. Even now, any young surgeon, who is enter-

prising enough to strike out a new line for himself, has to reckon with at least some opposition of this kind, although not to such an extent as formerly, when people were less accustomed to rapid change than they are now. Once we were liable to hear a surgical benefactor of mankind denounced as "reckless," "criminal," and occasionally as a "murderer."

A description of the older modes of treatment we pursued in the case of injuries and operation wounds will, better than anything else, bring home to you the enormous advance that has been made in rational surgery. Amputation wounds, for example, were always treated as "open wounds," which meant that before healing took place inflammation at least, and all its attendant dangers, had to be encountered. Primary union was regarded more as a lucky accident than as a result to be systematically aimed at. We had a kind of belief that "germs," as they were then called, were somehow concerned in the mischief, but no intelligent attempt was ever made to deal with them. Practically, we knew nothing about them. The most usual way of treating a freshly-made amputation stump was to wrap it in lint, kept constantly wet and exposed to the air. As soon as putrefaction of the abundant wound fluids set in, and inflammation, followed by sloughing of portions of the surface was well established, a poultice was applied, and when the slough separated, or even sooner, the foul or granulating surface which ever it might happen to be, was treted with a preparation known as "turpentine dressing,"—a mixture of country sweet oil and turpentine. Under this kind of treatment, or rather maltreatment, the stump if recovery was to take place, slowly healed in about two months, often taking a much longer time. The separation of the silk ligatures was frequently an extremely wearisome process, and might keep a wound open indefinitely. During this prolonged period of healing the stump had to be dressed, even in the most favourable cases, at least fifty or sixty times, while the patient was, at the beginning, exposed to all the risks of ordinary septic poisoning, and throughout the whole course to tetanus. From the latter cause a certain proportion of amputation and other operation cases died every year,

while more died of exhaustion due to long continued and wasting discharges. I am bound to say, however, that the more common septic affections were exceedingly rare, and this immunity resulted from the superior sanitary surroundings of our patients as regards ventilation. Were it not for this fortunate circumstance, the mortality must have been disastrous. The records of the Medical College Hospital at Calcutta, as set forth in Sir J. Fayrer's book, bear witness to the evils which general insanitation can bring about when combined with methods of treatment such as I have described. We had to deal with a septic outbreak here some years ago, and this was distinctly caused by bad ventilation, as well as by the abuse of antiseptics which had been allowed to degenerate into substitutes for cleanliness. Putting aside the numerous risks to which amputation and wound cases were exposed, it is hardly too much to say that patients who got well must have done so, accompanied with a certain degree of permanent constitutional injury. Amongst minor disadvantages I may mention the loss of time, and the trouble and expense of the frequent dressings that were necessary. Compound fractures were treated on similar principles, and with the same unsatisfactory results. Few cases escaped without local abscess or necrosis. Secondary amputation was not infrequent, while exhausting discharge and tetanus killed a considerable proportion of the cases. Cleanliness, as we now understand it, was a thing unknown and unthought of at operations, or in the general management of wound and injuries. The application to a fresh wound surface of a sponge contaminated with septic material, was a common practice, and was regarded as of no consequence one way or the other; it was too trifling a matter to need thought. Drainage of wounds was unheard of, nor was any attempt made to soak up discharges. Moisture, both inside and out, was held to be the most favourable condition for healing. That wound putrefaction and its results flourished was only too evident. My first recollection of the J. J. Hospital was its peculiar mixed odour of turpentine and decom posing organic matter. The smell sometimes reached the gate. Amongst other old-fashioned and pernicious practices the treat-

ment of the peritoneum was one of the worst. Protruded intestine, in penetrating wounds of the abdomen, was either oiled or washed with milk before being replaced. If soiled with foreign matter it was wiped with a septic sponge. In any case it was pressed back with unwashed hands. We were surprised then that after all this care and precaution the patient died in a few days of septic peritonitis. The intestine of a hernia was treated in the same manner. No wonder, therefore, that surgeons were afraid to meddle with the peritoneum. Men who still adhere to old-fashioned ways of thinking have not, and never will, get over this fear. Patients were allowed to die from ruptured intestine, or from internal hemorrhage, rather than attempt anything apparently so risky as interference with the peritoneum. Fractures of the skull we formerly regarded as very fatal accidents, and with good reason. If compound, the unscientific applications and want of cleanliness too often led directly to inflammation and death; while we fear to undertake operation in other cases which needed it on account of the fatal inflammation that was nearly sure to result from the same causes.

Bad as the state of affairs I have described appears in the light of our present knowledge, we were models of successful surgery as compared with the experience of other hospitals. This however was, as I have said, due chiefly to the superior sanitary conditions of the J. J. Hospital, and to but a slight extent, if at all, to treatment. Our modes of treatment were, as I think now, calculated to kill rather than to cure. Had the hospital been overcrowded, ill-ventilated and dirty, only a comparatively small proportion of the more serious cases would have had a chance of escaping death or mutilation. We followed authority, and naturally throught we were doing the best for our patients, and at the same time teaching the most approved methods of treatment to the students who came to learn. Our imperfect knowledge of the facts of surgical pathology permitted us to do things which a more exact acquaintance with that science now causes us to regard with positive horror and dismay. We resembled the bone-setters, who are reckless in proportion to their ignorance of anatomy.

The foundation of the new surgery was laid by Sir Joseph Lister somewhere about twenty-five years ago. It was an old theory that the entrance of air into a wound or cavity was directly concerned with the familiar putrefactive and fermentative changes that took place; that the air carried with it a "something" to which it was supposed these changes were due. It was always common knowledge that dead organic matter in the presence of moderate heat and moisture became putrid under the influence of some occult agent. It was known also that the putrefactive agent, whatever it was, could be destroyed or rendered inert by great heat or cold, or by the action of certain substances, such as salt or sugar, which were known and used as preservatives; and it was on immemorial experience of this kind that various domestic and trade methods for the preservation of meat from decay were founded. Thirty years previous to Lister's experiments the assertion had been made that the air was laden with "germs," as they were called, and that these must, in some way, be concerned in the production of certain fermentative processes. Within comparatively recent times indeed it was believed that putrefaction was caused by the atmospheric oxygen. The later researches of Pasteur, however, cleared away much of our ignorance, and at length placed the "germ theory" of putrefaction and fermentation on a firm basis. He showed that both these processes were dependent on the access of minute organisms with which the air was laden, and not on any of its gaseous constituents. About the same time Lister, in his investigations into the nature of inflammation, came to the conclusion that this complication of wounds and injuries was due to the "irritating and poisoning influence of decomposing blood or sloughs." Connecting this knowledge with Pasteur's discoveries, he then conceived the idea that if he prevented decomposition by the use of a germicide, inflammation would not occur, and that the wound might be expected to heal by primary union, and without any of the usual risks.

The principle of the Listerian method of treatment was the adoption of precautions, with the view of preventing germ-

laden air from coming into contact with the wound and thereby causing decomposition of its fluids and surfaces. We may describe it in other words as the interposition of a barrier of some kind between the wound surface and the impure outer air. This barrier consisted of one of the substances which we know generally as antiseptics ; such antiseptics possessing the power of destroying or paralysing the "germs"—or micro-organisms, to give them their proper name—so that if air did pass through the antiseptic covering of the wound, it came in germ free, and thus putrefaction and fermentation were prevented, with the result that the wound healed without inflammatory or septic changes and their attendant evils.

In 1866 Lister's first experiments in this direction were made and the antiseptic he used was carbolic acid. This he was induced to employ on account of its deodorant effects upon sewage, and its ability to destroy the entozoa which had, previous to its use, infested the cattle fed on a sewage farm. The plan of treatment and all its later developments is still known as the "antiseptic method ;" properly speaking, however, it should be termed the *aseptic* method. Antiseptic treatment, correctly so called, permits of the introduction of micro-organisms into a wound cavity, while measures are taken either to destroy them there or at least to interfere with or prevent their growth and action. Antiseptics applied to such wound or cavity may kill the organisms outright, or may merely render them inert until healing takes place.

As with most new discoveries dealing with the practical application of scientific theories, more especially when they come into conflict with old-fashioned or traditional beliefs and dogmas, a furious controversy raged around Lister and his work. It has not even yet subsided. Most of it was probably due to the exceedingly imperfect knowledge of surgical pathology which then obtained. There was certainly a considerable degree of "groping in the dark" associated with the first researches into the antiseptic methods. The labours of many enthusiastic workers and believers in Lister, both in England and Germany, soon however began to dispel the darkness. Further deve-

lopments of the Listerian principles and methods followed one another rapidly; while experimental pathology continually added to our knowledge, and at the same time revealed the depth of our previous ignorance. A good deal of the warfare was concentrated round the "germ theory." We still probably have old conservatives amongst us who disbelieve in the existence of micro-organisms and all their works. With our present experience it seems strange that so much importance should have been attached to carbolic acid in the earlier days of antiseptic surgery. I have known some who regarded it with a sort of superstitious reverence. Another sharp controversy arose as to who had first employed it in the treatment of wounds. It was true enough that many had used it before Lister; but it is not to them that the inauguration of the antiseptic system or the new surgery belongs. It is to Lister alone the honour is due—to the genius who had the intelligence to perceive how the previously existing knowledge could be applied in practical surgery, and who above all, possessed the necessary patience, and capacity for taking trouble, which ultimately led to such important results.

The first object of antiseptic treatment was to prevent putrefaction in wounds and thus lead to primary union; but as time went on and experience and knowledge increased, it became evident that patients were not always relieved from risk, even though the absence of foul odours indicated freedom from putrefactive and fermentative changes. This observation grew into the discovery that the infective diseases connected with injuries and operations, such as pyæmia and erysipelas for example, were due to the growth of specific micro-organisms in the tissues or fluids of the patient affected. Further pathological research adds something new every day to this department of knowledge. We are becoming more and more familiar with the life-history and modes of action of micro-organisms. New species are being discovered constantly, and the tendency to regard most diseases as dependent on them, either directly or indirectly, grows greater daily. There seems danger indeed of the *Bacillus* theory of disease being overdone, and a reaction against it is not improbable.

Numerous other antiseptics were experimented with by Lister and his followers. Many new agents have appeared and disappeared. One antiseptic is the fashion to-day, to be replaced by another to-morrow. Carbolic acid, although now occupying a very inferior position as compared with its former supremacy, still holds its own as an antiseptic for purposes of cleanliness: it is efficient to a certain extent, and it is cheap and easily used. As an antiseptic for obtaining primary union I cannot say, however, that I have ever had any particular confidence in it myself. It has the very great defect of being volatile—of not being sufficiently permanent to remain long enough in the dressing till all fear of putrefaction in the wound discharges is at an end. Corrosive sublimate, one of the most potent germicides we possess, is in supreme favour at present. We have used it here for the last seven years. To name and describe even a portion of the antiseptics which have been employed and recommended within the last few years, would need more time than can be given in an address like this. It will be sufficient merely to allude to them.

Besides the simple aseptic treatment of wounds Lister has taught us many other things. He showed, for instance, that a foreign body imbedded in the tissues does not necessarily lead to inflammation and suppuration; that, provided it is aseptic when introduced, it may remain in the tissues for an indefinite period without producing any ill effect whatever. His experiments in this direction led to the use of the aseptic ligature. He taught us something else, too, of much more importance, namely, the extreme value of the most scrupulous and patient attention to manipulative details. There is one thing, however, that we have learned from his opponents, and that is, the virtue of cleanliness. Those who refuse to accept Lister's theories and methods, said from the beginning that antisepticism, or rather Listerism implied after all nothing more than cleanliness: they set themselves to prove it and succeeded. They found that if only perfect cleanliness was observed, wounds healed as readily as when treated under the most elaborate Listerian procedure, with its numberless precautions, appliances, and

antiseptic preparations. Any surgeon, worthy of the name, is now accustomed to regard the terms aseptic and antiseptic as synonymous with cleanliness, and most perceive the fact that antiseptic materials and applications cannot be employed as substitutes for cleanliness. To do so, as I am afraid, is too often the case with unscientific observers, really means not only a return to the pre-antiseptic methods of treatment, but, by the false sense of security the practice gives rise to, imports an additional element of danger. So thoroughly do some surgeons recognise and understand the value of surgical cleanliness that they are content to dispense with all the usual germicides, and for cleaning purposes after operation employ nothing but pure water. Their success leaves little to be desired. With this practice we may associate the knowledge, long unsuspected, that healthy tissues, or rather healthy leucocytes—phagocytes they have been termed—are themselves antagonistic to putrefactive micro-organisms : they not only resist their inroads, but are capable, within certain limits, of completely destroying the invaders. It was Dr H V. Carter, several years ago, who first introduced me to this knowledge, derived from his own observation. He described to me how he had seen leucocytes at work. This threw light upon what, to me, had previously been obscure, and explained how it was that in cases where no antiseptic was applied to the wound, the aerial microbes, which must have fallen upon its surface in large numbers, and were shut up in it by the dressing, failed to show the slightest sign of activity at any time during the progress of the case. The leucocytes had simply eaten and digested the intruding microbes.

There remains one thing more which the new surgery has taught us. We have learned from it what an important part may be played by even the minutest detail of procedure, more especially as regards the work of attaining surgical cleanliness. We have at last come to realize that the success or failure of a great operation may depend upon what a superficial or careless observer would probably regard as a mere trifle unworthy of notice. I am convinced that more operations fail to do well from neglect

of the "trifles" than from any other cause; and this is chiefly true of antiseptic surgery. It is an old saying that trifles make perfection, but that perfection is no trifle. Apart from the patient, nobody has a greater interest in the success of a case than the surgeon in charge. Experience teaches him the value of strict attention to the so-called "trifles," and he soon learns that no one can look after them so well as he can himself. The rule then to be deduced from these facts is—that when you want a thing well done, you must do it yourself. This rule is applicable to many circumstances of daily life, but is pre-eminently so in all matters connected with the new surgery. Those who have been my pupils will readily call to mind how persistently I have always inculcated this rule. One great advantage flows from it—if there is any failure, or things do not take precisely the course you anticipate, it is easy to lay your finger on the defect in manipulation, and so avoid it in future. This it is difficult or impossible to do if one has to depend too far on the obedience and memory of others. You may take my word for it that the most successful surgeon is he who does things himself, and has the greatest capacity for taking trouble.

Having already drawn a picture of the old-fashioned maltreatment of an amputation wound, let me now describe its rational treatment according to the new methods. I mentioned just now that healthy tissues possessed the power of resisting or overcoming, within certain limits, an invasion of particular micro-organisms. This fact teaches us the necessity of improving the general health of the patient so as to strengthen his tissues, or rather the leucocytes, for a possible combat between them and the invaders. It is old knowledge that the healthier the tissues, the more readily do wounds heal. Now we know the reason. Whenever time permits, general treatment of this kind invariably precedes an operation. The next step is the cleansing of the limb surface. The skin is a favourite haunt of microbes, and peculiarly dirty skins may take hours to purify. Even then we cannot be certain, although our efforts at least diminish the number of the "germs." The

cleanliness of instruments and sponges has now to be carefully looked to; it is in these, especially the latter, that infective material most frequently lurks. The ideal knife should be made in one piece. Ligatures, sutures, and dressings also receive the same scrupulous attention. If you are wise you will keep the ligatures, sponges, and dressings in your own possession under lock and key. The hands of the operator and his assistants must be purified, and all engaged should have on, if possible, clean clothes. Any one coming from the dissecting room or dead-house should be rigorously excluded. We will suppose the limb to be taken off. The aseptic silk or catgut ligatures are now applied to all the larger vessels and the ends cut short. The smaller bleeding points are closed by pressure from the catch forceps. When the latter are removed the surface may be directly wiped dry with clean sponges, or be previously washed with pure water or some kind of antiseptic lotion. The next step is to bring the surfaces and edges together with sutures. Accurate apposition here is an important element of success. Wherever there are spaces there will the wound fluids, in which microbes flourish best, accumulate. A drainage tube may now be inserted, although it is not always necessary to do so. After a last wipe with a clean sponge the dressings are applied. The essential qualities of a good dressing are that it should be dry and absorbent in order to soak up all fluids that may drain from the wound. It should also be medicated with some sort of permanent and unirritant antiseptic, so as to prevent putrefaction of the fluids which collect in it. Numerous experiments have convinced me that nothing is so efficient for this purpose as absorbent cotton impregnated with boracic acid. A considerable thickness of the dressing must be applied, and this is required for three reasons: the discharge of wound fluids may be considerable; secondly, an elastic cushion under the outside bandage is necessary in order to ensure firm and equable pressure over the whole wound or stump; and thirdly, the parts must be kept warm. Equable elastic pressure is highly important: it keeps surfaces in close apposition and lessens or prevents the oozing of the objectionable wound

fluids. Pressure also means rest, without which no wound can heal satisfactorily. Under former conditions we thought it wise to keep wounds cold and mosit by way of preventing or reducing inflammation: now, we prefer to have them warm and dry, since we know that they do best and unite most rapidly at the natural temperature of the body. The final step of the operation is to fix the limb securely, so that perfect general rest may be maintained until union is complete. A lower limb is put up in a box splint, while an upper extremity is fastened to the side of the chest.

The procedure just described takes about ten times longer to get through than the operation of pre-antiseptic days. Then, the main consideration was too often the dexterous and artistic removal of the limb, while the first dressing was left to take care of itself; now, matters are, to a great extent, reversed, and the dressing is regarded as the most important and essential part of the proceedings. The removal of the limb is done with deliberation, and with an absence of the show that formerly characterised amputations. A prime object is that the surfaces and edges shall fit accurately together, and this cannot be fully attained if too much haste is exercised. A dressing, such as I have described, should remain undisturbed for ten days. If all has gone well, as the thermometer will unerringly inform us, it may be removed, when firm union is usually found to have occurred. The drainage tube may then be taken out, and, a day or two later, the sutures. Two or three dressings in all should suffice. Some of the unsoiled original material will do quite well enough for subsequent dressings. Compare now the old and new methods as you have heard them described, and you will perceive what a vast amount of trouble, time, and expense are saved, besides the numerous risks to the patient, by the careful application of common-sense principles. In surgery, nothing is so true as that trouble and patience at the beginning prevent incalculable labour and loss of time afterwards. The great degree of success which this mode of treatment, conscientiously carried out, has met with, has surprised even myself.

The new treatment, as it may be called, is now followed here as far as possible, in all cases of surgical and other wounds. The results are, as I have just said, highly successful. I may say with truth that mortality after amputation, either as a direct or indirect result of the operation, is practically abolished. Compound fracturss, even of the severest kind, unite as readily as simple fractures. Secondary amputation, which was formerly so common as a consequence of these injuries, is now unknown amongst such cases as are treated from the beginning in our hospital. Except for the cases of compound fracture submitted to domestic or bone-setter's treatment, we have not had to perform secondary amputation for some years past.

It must not be supposed, however, that these favourable results have been attained all at once. It would take me much more time than I can afford on the present occasion to tell you of the numberless experiments that have been tried, and of the labour and trouble it has cost me to bring our methods to their present comparative state of perfection. We have had many ups and downs. Success and failure alternately. Oftenest at first disappointment; but as time went on we learned from our mistakes and failures what to avoid. Once or twice indeed accident gave me a valuable lesson. The history of my early struggles, as I may well call them, will be found in the *Lancet* of March the 27th and April the 3rd, 1886.

I began work with a full belief in all Lister's elaborate precautions and appliances, and adopted them as far as the means at my disposal permitted. Before long, however, experience showed me that very many of them were superfluous, and therefore unnecessary; and that the simpler I could make the dressing, the better were the results. Detailed contrivances and minute appliances, which were supposed to be essential to success, were dropped one after the other. I realized that to carry out the Listerian method logically was impossible; that, take what precautions one would, microbes must be enclosed in the wound. I reasoned, then, that the most efficacious way to overcome this defect was to deprive them as far as possible of the soil in which they lived and multiplied;

otherwise, the wound fluids: and this was accomplished by accurate apposition of surfaces and edges, by pressure, drainage, and by the use of dry absorbent dressings. Moisture in the dressings, in every shape and form, was abolished. It was soon discovered that the Listerian "protective" was a retainer of moisture, and it disappeared like other superfluous appliances. The phagocyte discovery came to my aid also and pointed out the right way. I have never used the antiseptic spray, partly on account of the extremely unpleasant dampness it caused, but chiefly from the belief that so far from acting as a purifier of the air, the atmospheric currents it produced actually carried with them fresh relays of microbes from even the remotest corners of the operating room. There were other reasons besides which I will allude to presently.

I see that Lister, in his address on Antiseptic Surgery at the recent International Medical Congress at Berlin, states that he abandoned the use of the spray three years ago, and that he is "ashamed he should ever have recommended it for the purpose of destroying the microbes of the air." If a humble follower of his like myself may be permitted to say so, I can only express my amazement that Lister should not have discarded the spray many years earlier. Aërial microbes are far too tenacious of life to be destroyed, or even injured, in this way. Still more, under ordinary sanitary circumstances, they may safely be ignored. With proper cleanliness and dry dressing they can do no harm: the phagocytes will soon dispose of any that are shut up in a healthy wound or serous cavity. This at least is the principle I have worked on for a long time, and see no reason to be dissatisfied with the results. It stands to reason that the exceedingly dilute condition of the antiseptic in the spray must at once render it useless as a germicide. I have already mentioned how I came to understand the reasons for the impotence of the aërial microbes which no art will prevent from gaining access to the wound before the dressings are applied.

Another reason against depending too much on antiseptics was the undoubted tendency that existed to employ them as

substitutes for cleanliness, by way of saving time and trouble. I once discovered the spray being thus misused. The conversation which ensued confirmed my determination to banish it from hospital practice. Foreseeing that antiseptics were in danger of being abused, to the discredit of surgery, my aim was to find out how far I could attain success without them. Cases will, of course, occur where antiseptics must be used. The parts may be already infected with septic matter beyond the vital powers of the tissues to deal with. If the tissues are unhealthy, as in many cases of operation for disease, we must come to their help with antiseptics; always bearing in mind, however, that previous preparation of the patient, surgical cleanliness, dryness, and rest in all its aspects, are the chief means we must rely upon for success. The marked improvement in results which followed greater simplicity of procedure was doubtless in part due to the increased manipulative facility that was developed by larger experience; but chiefly, I think, to less reliance being placed on the virtues of antiseptics, and more on those of surgical cleanliness. I came at length to see that without the latter antiseptics were worse than useless.

Enough has now been said about antiseptic treatment and what we may call its direct results. Let us see what are the indirect developments of surgery which have flowed from it. Abdominal surgery has made enormous advances, and this is to my mind, mainly due to the fact that we have come to realize fully how much depends on cleanliness alone. In former days no surgeon would meddle with the peritoneum if he could in any way avoid doing so; now, we think nothing of opening it on the slightest provocation. Experience has at last convinced us of the fact that, so long as surgical cleanliness is observed, the peritoneum is perfectly tolerant of operative procedure and may be handled with impunity. The impetus which this knowledge has given to abdominal surgery in all its branches, during the last twenty years, is beyond belief. We can readily picture the amazement of a surgeon of the old school, could he rise from the dead and see how the peritoneum is treated at the present day,—a structure which he dared not interfere with,

knowing but too well that if he did, the result would be fatal septic peritonitis. Lister, and his opponents who taught us the value of cleanliness, have between them effected a complete revolution in abdominal surgery. Ovariotomy as an operation does not seem to gain much ground in Bombay. Despite its wonderful success in England, and our comparatively large success here, in the limited number of cases we have been allowed to operate upon, the people of this country appear inclined to view it with a certain degree of distrust; they still need to be educated into an appreciation of its advantages. A considerable proportion of the ceases that come under notice seek advice too late to permit of successful treatment. Penetrating abdominal wounds, with protruded or injured intestine, now do infinitely better than formerly, the reason being that we are no longer afraid of the peritoneum, and do not hesitate to open or handle it freely in order to attain cleanliness. Fifteen or twenty years ago an injured intestine or damaged peritoneum were left to take care of themselves, and the cases mostly proved fatal. Now, as a matter of routine, we repair and suture wounded intestine, resect a portion of it if too far damaged, apply ligatures to bleeding vessels, and clear the peritoneal cavity of blood or intestinal contents. All these steps our predecessors would have regarded as dangerous, and as bad or meddlesome surgery. We, on the contrary, should hold that we failed in our duty to the patient did we leave him to nature, and drugs; which means, in other words, doing nothing, because we feared the result of our intervention. The radical cure of hernia may perhaps be regarded as an offset of abdominal surgery. The old dread of peritonitis having vanished, I now always open the hernial sac boldly in order to see clearly what I am doing, and to be certain that its contents are properly returned and in good order. My confidence in the tolerance of the peritoneum when treated fairly has never been misplaced.

Wounds of, and operations on, healthy joints are followed by most excellent results when treated on antiseptic principles. Under the old and ignorant methods inflammatory destruction

of the joint, with possibly loss of a limb, or at least ankylosis, was the consequence. At the present day we are dissatisfied if a perfectly restored joint is not the issue of our treatment. We no more hesitate now to interfere, when necessary, with synovial membranes than we do with serous membranes.

Brain surgery has made great advances. I need not enter into what has been done at home in the way of diagnosing and sucessfully removing cerebral tumours. In our hospital the operation of trephining has lost its fears: we are no longer afraid of the meningitis that used so invariably to follow septic infection of the wound, which infection was always brought about by uncleanliness. We have even ventured to explore the brain in search of an abscess, and with a sucessful result.

Renal surgery, too, is advancing, and in Bombay calculi have been successfully removed from the kidney. As regards vesical calculus, its removal from the bladder by crushing, at a single operation, under chloroform, threatens to supersede lateral lithotomy altogether. Dr. Keegan of Indore has applied lithotrity to children with astonishing success. Lithotrity is becoming fashionable in this country, chiefly, I imagine, because the knife is not used. I confess to seeing with great regret the decadence of lateral lithotomy. There is no more beautiful operation in the whole range of surgery, and none more successful when properly performed.

Reparative operations of all kinds have advanced far on the road towards perfection since the introduction of Listerism. Union by first intention is an essential element of success in such cases, and the new surgical methods ensure it.

The antiseptic ligature has done away with most of the risks connected with the deligation of arteries. Since its introduction into our hospital, I have never known secondary hæmorrhage to occur. This accident was, in Europe, certainly, the one most dreaded after amputations or after ligation for aneurism. Now, when a ligature is aseptic, unirritant, and remains buried in the tissues indefinitely, while the wound heals by primary union, all danger of secondary hæmorrhage is obviously at an end. Just twenty years ago, and long before I was in

a position to work out the subject of Listerism as fully as I have since done, my first important aseptic operation was performed. It was deligation of the common carotid for aneurism; and it need hardly be said that my satisfaction was unbounded when the wound healed by first intention under carbolic acid dressing. In those days no suitable catgut was to be obtained in Bombay: I therefore employed aseptic silk, and it succeeded so admirably that I have never since used any other kind of ligature in these operations. Accidents to large veins during operations are no longer of the fatal importance they once were. The lateral sinus may now be opened successfully for the removal of a septic thrombus, and the internal jugular ligatured in order to prevent the septic matter from gaining access to the general circulation. Twice recently in the J. J. Hospital a portion of the internal jugular has been resected for adherent tumour, and the patients were none the worse. In pre-antiseptic days such operations as the latter would most certainly have led to septic phlebitis.

Amongst the numerous blessings that have sprung from Listerism, none are of greater importance than the abolition of the septic diseases which formerly decimated surgical wards. A case of septic disease in the J. J. Hospital is now exceedingly rare, and when one does occur, it is always imported from without. Owing to the free ventilation of the hospital, and to its comparatively favourable surroundings from a sanitary point of view, septic outbreaks have been few and far between, and have been easily controlled. I have spoken of the improper use of antiseptics as directly producing a false confidence and sense of security for which there were really no substantial grounds. This is what I call the abuse of antiseptics. The principles on which they should be employed are forgotten; one antiseptic is considered to be as good as another, ordinary cleanliness is neglected and they are used as its substitutes. This state of things led to the last, and worst, septic outbreak we have ever had in our hospital. I was not responsible for it, I am glad to say, although it happened to be my duty to investigate the matter and

provide the remedy. The conclusion that the abuse of antiseptics was its main cause could not be resisted, while the lesson it conveyed was most valuable. Antiseptics are excellent servants, but they must be used rationally, and not made to do double duty in order to save present trouble. Cleanliness comes first, antiseptics second. Any departure from this rule will invariably rise up in judgment against the offender. Another septic scourge of surgery in this country, in the shape of tetanus after operations, has quite disappeared from the J. J. Hospital under the new system of dry antiseptic dressings and rapid union. We still, however, have to deal with a good many cases of it. Some are admitted from without, with tetanus already established; others are instances of accident or disease where antiseptics are used too late, or where circumstances interfere with their efficient employment at any stage. Not the least of the blessings for which we have to thank carbolic acid and its successors, but chiefly the former, is the abolition of the old familiar hospital odour which had its origin in the uncontrolled putrefaction of the discharges and surfaces of open wounds.

It seems hardly fair, after all, to credit Listerism alone, as some do, with the whole of the enormous developments of surgery in recent years. Research in surgical pathology has had a large share. To my mind, however a great part, if not the largest share, of the honour belongs to anæsthetics. But for anæsthetics how could we possibly undertake most of our ordinary operations of the present day ? We could not spend so much time over them, nor work with the deliberation and care, and attention to detail, so essential to success. Without anæsthesia such operations would practically mean the most cruel and barbarous form of vivisection. In fact, they could not be undertaken. If I were asked then to what I should chiefly attribute the new surgery and its developments, I should answer:—first of all, to anæsthetics ; next, to the labours of Pasteur as regards micro-organisms in connexion with putrefaction and fermentation ; and, thirdly, to the genius of Lister, by which the facts of science were applied at the right moment and in the right way. Nor can we deny Lister's opponents

their place in their great work. By their efforts to discredit his theories they showed us the extreme value of simple cleanliness, and by their brilliant results proved it. So far from weakening Lister's position their labours actually added strength to it. We cannot ignore, either, the bacteriologists, of whom Koch is the illustrious leader. Their investigations into the life-history of micro-organisms have let in a flood of light on septic diseases and processes, and have thus enabled us both to understand them better and to cope with them more effectually. Bacteriology has entirely changed the face of surgical pathology, and must now take a place as an essential part of modern surgery.

The subject we have been discussing is large enough to provide material for two or more introductory addresses. My aim has, therefore, been to place it before you only in its more important aspects. There are still many matters connected with the new surgery to which I have not even alluded. I have said sufficient, however, to show you what a complete revolution has been effected, not only in methods of treatment, but in our conception of surgery as a whole. What has been already done is, in my belief, nothing to what will be accomplished in the future. We are only beginning. The possibilities of surgery, as we now know it, offer a fascinating subject for speculation which it is difficult to resist here. Not so very long ago an eminent authority said that the Art of Surgery had reached its limit, and could go no further. Any assertion of this kind made now would be rightly received with ridicule by the younger and more enterprising generation of surgeons. All the more honour is due, therefore, to those of the older school who were clear-sighted enough to foresee what was coming: who wisely gave up cherished beliefs the moment these were proved wrong, and joined heart and soul with the party of progress. It is only those that were educated under the pre-antiseptic system who, provided they have kept pace with the advance of science, can fully realize the immense changes that have taken place. Many of us here present are old enough to be able to compare both systems, and in that respect we pos-

sess the distinct advantage I have just indicated. Remembering the evils of *septic* surgery, as it may well be termed, we are in a better position to appreciate at their full value the blessings of the modern *aseptic* surgery.

Obstacles to the advancement of surgery in this country we have in abundance. Still, there are none of them that may not in time be surmounted. I have already touched upon a few of those connected with the preference which so many of our medical graduates manifest for the practice of physic. Amongst other difficulties in our path may be noted the late period at which patients suffering from surgical disease seek advice from those who are really qualified to help them. Many cases come to hospital, and are seen in private practice, who are past treatment, and for whom nothing can be done, and who might have been saved had they but applied earlier for scientific aid. The misplaced confidence of people, who ought to know better, in the powers of quacks and irregular practitioners of all kinds, is another great hindrance to surgical progress. How it happens that a particle of faith can still remain to be placed in these enemies of the human race, after seeing daily the lamentable results of their ignorant confidence and criminal mal-practice, is a mystery. I am convinced that by combination and the exercise of surgical enterprise our educated practitioners have it in their power to lessen considerably the difficulties and evils I have mentioned.

If anything I have said to-day brings home to even two or three of my hearers a sense of the capabilities of modern surgery, and if my words should induce them to cultivate it with the same zeal with which so many of their professional brethren pursue the practice of physic, I shall be well content.

Two Cases of Locomotor Ataxy Treated by Suspension.

By Brigade-Surgeon D. E. Hughes, Acting Professor of Medicine and Therapeutics, Grant Medical College, and First Physician, J. J. Hospital.

Case I.—Narayen Bhai, aged 47, a coppersmith by trade, and in fairly good physical condition, was admitted into Ward 15, on the 12th August 1889, complaining of inability to stand or walk or to use his hands for any delicate operations.

He stated that six weeks before admission he suffered from a severe attack of dysentery which readily yielded to treatment. The dysentery having been arrested, he found that he was quite unable to stand, although he could freely use his limbs in bed. At this time he also noticed that he was unable to button his clothes or convey food to his mouth with the same facility as heretofore. These phenomena were not preceded by any sensory symptoms in the lower limbs, but tingling and formication were noticed in the fingers before the paresis of the hands set in. No history of syphilis or inordinate venery. No neurotic family history.

On admission the patient was quite unable to walk or even to stand without support. The gait, when an assisted attempt at locomotion was made, was markedly ataxic. The patient was quite unable to tie the strings of his "bundy" even when closely watching the movements of his fingers. The knee-jerk was absent. No ankle clonus. No tenderness along spine, but occasional darting pains in the limbs. Sexual desire present. Pupils present the "Argyll Robertson" phenomenon. Vision good. Muscles respond normally to the faradic current. No bowel or bladder trouble. The patient was treated with nitrate of silver, blisters to the lumbar region and faradization to perserve the nutrition of the muscles. This treatment was persevered in for six weeks without the patient deriving any benefit. On the 3rd October it was determined to try suspension, and the sufferer was accordingly suspended by the occiput and chin for 1½ minute. Support was also

given under the axillæ, but the support was almost entirely moral, the straps being loose. No bad effects being experienced, the suspension was repeated on the 5th and steadily continued for gradually increasing periods on every alternate day. Gradual and steady improvement began; after a few suspensions the lightning pains disappeared, and on the 29th October it is noted that he was able to get off his coat without assistance. At first he had to be carried to the suspension apparatus, then he was able to walk with the support of two hamals, throwing his limbs about in the most extraordinary manner; then he was able to dispense with assistance of one, and shortly afterwards the other hamal, and trust entirely to the support of a stick, which in its turn was discarded. After the suspension treatment had been persevered in for about three months, he was able to walk about the wards quite unaided, the gait being still ataxic though in a much less degree. He was discharged from hospital on the 12th June 1890, able to walk steadily, to stand for a short time with his eyes shut, to button his clothes with some little difficulty and feeling well, but the pupils still remained insensible to light, although they contracted for accommodation, and the knee-jerk remained totally absent.

Case II.—Balu Babajee, aged 25, a cooly by occupation, was admitted into Ward 15, on the 29th August 1889, complaining of loss of power in the legs, incontinence of urine, and constipation.

Two years previous to his admission he suffered from chancre, which was followed by eruption and sore throat. Eighteen months after contracting syphilis he was attacked with giddiness and partial paralysis of the left leg. After a month's treatment these symptoms disappeared, but after a short interval he began to suffer from "girdle" sensation, weakness and pain in the legs, and inability to walk steadily.

On admission the gait was noticed to be ataxic, the left leg being rather more jerky and erratic in its movements than the right. The man was unable to walk backwards or stand with eyes shut. Slight numbness in both limbs was complained

of, as well as pain, sometimes, especially at night, exacerbated and lightning-like in character, along the course of the sciatic nerve. The patellar reflex was abolished in both knees, but the muscles responded normally to the faradic current. The "girdle" sensation is complained of, and urine is passed involuntarily and the bowels are very constipated. The left cornea is opaque and the right iris adherent and immobile, but the patient can see fairly well. No complaint of giddiness. There is no loss of co-ordination in the hands and arms.

Under 5 grain doses of Iodide of Potassium, blister to the loins and occasional subcutaneous injections of Morphia, the sciatic pain was relieved in a little over a week, but the other symptoms were unaltered. The comparative immunity from pain, however, was but temporary; after about a fortnight (24-9-89)numbness in the thighs and legs was noticed, and two days afterwards severe shocting pains were felt; some relief was obtained from these pains by the addition of Ergot to his Iodide of Potassium mixture, and the application of a blister to the loins. The patient being in almost exactly the same condition as on admission, it was decided to try suspension on the 5th November. As the patient was a little nervous, he was only suspended on the first day for 15 seconds. On the morning following this short suspension the man volunteered the statement that his pains were less, and that he had passed a much better night than usual. The suspensions were repeated on alternate days, the time of suspension being gradually increased, the girdle and lightning pains disappeared, the bowels became more regular, the incontinence of urine ceased, and the patient gradually regained the power of co-ordination under this treatment. On December 10th he was able to walk without the aid of a stick, but still very unsteadily. On the 31st May 1890, he was discharged very much improved, I might almost say cured. Although there was still an absolute loss of knee-jerk in both legs, the patient could walk steadily without a stick and stand with his feet together and his eyes shut.

It should be noted that in both these cases, the usual routine drug treatment for spinal sclerosis was carried on concurrently with suspension. The first patient took one-eighth of a grain of Nitrate of Silver and the second three grain doses of Iodide of Potassium twice daily for months. In neither case, however, did the slightest improvement take place till after suspension had been practised. Narayen Bhai stated that he "felt better," how, he could not say, after the first suspension. I was unwilling to try the new treatment in Balu Babajee's case which was of syphilitic origin, as such ataxies are often markedly benefited by Iodide of Potassium. The patient, however, suffered so severely from pains, only temporarily relieved by Morphia given hypodermically, that I tried the suspension for the relief of that symptom. The disappearance of the pains was so rapid and the improvement so steady in other respects that I persevered with the treatment.

Having satisfied myself that some good may be expected from this mode of treatment, I am trying suspension without drugs in two cases of locomotor ataxy now in hospital. After some six suspensions, in both of these cases there is decided amelioration of the lightning pains and formication complained of on admission, but so far there is no improvement in the power of co-ordination.

These two cases, just referred to, of posterior sclerosis, treated by suspension without drugs, cannot be claimed as successes. In one, that of a young man 23 years of age, whose symptoms, save that he suffered from almost nightly seminal emissions, closely resembled those of Case I, the suspensions seemed in the end actually to do harm. The lightning-pains were certainly relieved by the short suspensions of from 15 to 30 seconds duration, but when more prolonged, caused an aggravation of all the symptoms. The patient, whose disease was probably due to masturbation, became demented, and melancholic, and was ultimately removed by his friends, after three weeks routine treatment, in a worse condition than that in which he entered the hospital. In the

second case, that of a Jew, there was decided improvement in all the symptoms, including co-ordination, but unfortunately the patient absconded as soon as he could walk with the assistance of a stick, and before anything like the improvement noted in the two cases detailed at length had taken place.

Suspension was also tried in two other cases of spinal sclerosis. In the first the prominent symptoms were a markedly ataxic gait, formications, a feeling of tension in the muscles of the ham and calf, exaggerated knee-jerk and ankle clonus in both limbs; in the second there was a slightly spastic gait, a feeling of muscular tension and exaggerated knee-jerk without ankle clonus, but the symptoms which caused most distress were loss of control over the rectum and bladder. Suspension, combined with Iodide of Potassium, there being a syphilitic history in both, produced no improvement in the objective symptoms of either patient beyond removing the ankle clonus in the first and relieving the bladder trouble in the second. It was accordingly stopped for a time and the routine iodide treatment alone depended on. However, at the urgent request of the patients, who stated that they felt better after it, it was resumed.

In conclusion, I would wish to state that, in my opinion, suspension carefully used is at least a valuable adjunct to the ordinary routine treatment of spinal sclerosis. The hangings should not be too prolonged, and the period of suspension for a heavy man should be shorter than for a light one. In the first two cases, I proceeded very cautiously, the first suspension being for 10 seconds only, and more than two months elapsed before the patient was suspended for more than a minute. In these cases, at no time did any untoward symptoms show themselves. The suspensions in the later cases were too prolonged at first, and the period of suspension was too rapidly lengthened, with the result that ankle clonus was produced, jerkings and tension of the muscles, and formication increased. When the treatment had been left off for a time it was resumed carefully, the period never exceeding 40 seconds and the patients asserted that they felt relief.

Surgical Cases.

By Surgeon-Major W. K. Hatch, Professor of Anatomy, Grant Medical College, and Second Surgeon, J. J. Hospital.

I have selected the following as being of special interest and of some rarity in the practice at this hospital :—

I.—*Multiple Urethral Calculi.*—Of this condition we have had only one case during my connection with the J. J. Hospital; that case was reported by Brigade-Surgeon Banks, and the mass of calculi was situated apparently in the scrotum, the urethra forming a large sac in that part of its course. In the following case the mass was behind the scrotum, in fact in the perinæum and a similar case was reported from Calcutta in the *British Medical Journal* of this year. The patient stated that this complaint was only of a year's duration, but in all probability it dated from the time of an injury to his perinæum, which occurred years ago, while carrying a heavy load on his head, when he fell down and struck his perinæum against a stone; he suffered from retention of urine for two days and also from bloody micturition; he, however, did not notice any swelling until long after, and about a year ago the passage of urine was accompanied by pain, and he was obliged to pass a small quantity of water at frequent intervals.

The patient was a man of about 40 years, in a fairly nourished condition; he complained chiefly of pain and frequency of micturition, and had a pyriform swelling in the perinæum, commencing immediately below the scrotum and passing into it for some distance; the swelling gave a peculiar grating sensation on being handled and was also painful; he was constantly pulling at the prepuce, as is generally observed in patients with vesical calculi. He had a urinous odour, and also prolapsus ani; the left testis was atrophied.

On the 10th December the patient was chloroformed and a median incision made into the sac, which was in fact the dilated urethra, and two hundred and twenty small and large

stones were removed ; a few occupied the membranous and prostatic portion of the urethra, projecting in fact into the bladder itself. Altogether they weighed 2½ oz. and 10 grains, were much facetted, and looked when moist very much like the small bones of the wrist joint, the surfaces being concave and convex and very smooth. The largest stone was about the size of a walnut and the calculi were composed of urate of ammonia. Recovery was tedious, the sac taking a long time to contract; it gradually did so, and when he was discharged in March, at his own request, some urine was still passing through the wound ; a large sound could be passed into the bladder without difficulty.

II.—*Aneurism of the Femoral Artery.*—This is the only case of aneurism which has been available to surgical treatment during the last 12 months (1890). The infrequency of aneurism of the vessels of the limbs in India, as compared with Europe, has often been noted, and in the Journal of the Bombay Medical and Physical Society a table prepared from the report of the J. J. and Goculdas Hospitals proves this to be the case. The patient was sent from Sholapur by Mr. Scroggie, Civil Surgeon, who, fortunately for the patient, previously warned him not to allow anyone to meddle with the tumour, and consequently he came direct to this hospital. He was a porter by occupation, and engaged in loading Railway waggons. About 2½ months ago he noticed a small almond-shaped tumour in the right groin, about 3 in. below Poupart's ligament, in the course of the femoral vessels ; it throbbed at first but was not painful, and the man went on with his work as usual. When the swelling had increased, in spite of native remedies, to the size of a lemon, it became rather painful, and he was obliged to lay up. He found walking difficult, and noticed loss of sensation about the thigh ; he kept the thigh and knees slightly flexed, and remained in the recumbent position during the greater part of the day ; he gradually began to lose flesh, and the tumour continued to increase, sleep was impossible, owing to pain, even when at rest. Fifteen days before admission he burnt the right knee accidentally with an oil lamp

There was a history of gonorrhœa, but no syphilitic history. About 5 months ago he strained his right thigh while at work, but felt no bad effect at the time. His family history and habits were satisfactory.

On admission the patient was considerably emaciated, about 32 years of age apparently, face expressive of suffering; he was anxious and low-spirited. There was a large swelling on the right thigh anteriorly, commencing above Poupart's ligament, in fact the upper border could be felt nearly midway between it and the umbilicus. Below it occupied the whole of Scarpa's triangle and was somewhat conical in shape, projecting on the surface like three-fourths of an ordinary cocoanut; the most prominent point was 3 in. below Poupart's ligament and in the middle line of the thigh. The swelling was hard, tense and could not be emptied of its contents, pulsation was very visible, a thrill could be felt on palpation, and a bruit could be heard on auscultation; there was no impulse on coughing. Pressure on the iliac vessels caused pulsation to cease, but not entirely; there were no enlarged glands present or signs of inflammation. The hip joint and knee were kept flexed and anæsthesia was present to an inch above the patella, more marked on the inner side of the thigh; the outer side was slightly anæsthetic. The whole limb was markedly larger than its fellow; no œdema present; circumference at level of trochanter being 22 inches and of the left thigh 15 inches only. Pulsation could be felt in popliteal and tibial vessels. There was a raw surface on the inner side of right knee, about 3 inches square, having a healthy granulating surface. There was no sign of cardiac or other disease present. Patient was slightly feverish. He was admitted on April 10th, and after having had two good nights' rest, induced by morphia injection, operation was performed on the 13th, the bowels having first been well emptied and the skin of the abodomen and thigh completely shaved and treated with strong carbolic lotion. Thinking that the common iliac might require ligature I made (with the concurrence of the Senior Surgeon) the incision rather higher than is usual for ligature of the external iliac. Finding, however,

that the first portion of the vessel was quite healthy, it was isolated and ligatured in two places, the artery was then divided between the ligatures, no smaller vessels required ligature. The wound was dressed antiseptically, having been sutured; no drainage tube was put in, the limb was surrounded by a blanket and the patient removed to bed and kept quiet by opium. On the 15th evening temperature was 103. When the dressings were removed, the wound looked well and the foot was quite warm, the aneurism was fluctuating but pulseless; it was redressed on the 18th.

After this there was no fever, no pain or discomfort of any sort, and sensation gradually returned in the thigh. On the 28th the wound had entirely united by first intention. From this date the aneurism began to decrease in size, but though the margins were evidently harder, the centre, continued to fluctuate. On the 27th of June he returned to Sholapur able to walk freely, the tumour was about half its original size, and was evidently nearly consolidated.

III.—*Loose Bodies in the knee joint.*—This patient, a youth of 14 or 15, was admitted with a swelling of the left knee joint of a year's duration; while playing he received a kick a little below the patella. Three months after the swelling appeared, about 3 inches above and external to the seat of injury, and in another two months the whole joint was much enlarged; it was tapped by a "vaid," who evacuated a quantity of fluid and afterwards applied a cautery. The swelling did not return for two months, but a small nodule was noticed in the joint. Afterwards the joint gradually refilled and interfered with the movements of the patient, who accordingly came into hospital. His previous health had been good.

On admission the lad was of perfectly healthy appearance and well nourished, but the left knee was much enlarged; the swelling extended 4 inches above the patella and the joint had a globular appearance, a cicatrix running across the upper part. No pain was felt except on pressure, and when carrying a weight on the head a sensation was conveyed to the hand as if the joint were full of marbles; the loose bodies felt unequal in

shape, and the largest seemed to be three-fourths of an inch in length. The patella was very loose and could easily be slipped from side to side owing to stretching of the quadriceps and ligaments. He could walk well, and no sinking sensation or tendency to fall was ever present.

After careful preparation of the joint the patient was chloroformed and an incision parallel with the axis of the limb was made on the outer side; a quantity of synovial fluid at once poured out, and by gentle manipulation four coral-like bodies were likewise removed; the largest was about 3 inches in length, the other three were of like structure and appearance but smaller, they consisted of hyaline cartilage and were of a pearly blue colour. The joint was then injected with iodine lotion and the incision closed by sutures, thick cotton pads were then placed around the joint, and bandages and a leg splint also applied. Exactly ten days after, the dressings were removed; the incision was found firmly united, and a plaster of Paris splint was applied; this was again in turn removed after ten days when the joint appeared perfectly healthy. The patient was discharged able to walk well.

IV.—Hydatid of Orbit.—This patient, a woman aged 20, was sent into the Surgical wards for removal of the eyeball, as it was supposed that there was a malignant growth of the orbit. She stated that about seven months before admission she suffered from headache and pain in the right eye, the pain gradually increased, being of a stabbing and shooting character; two months afterwards she noticed that the eyeball had suddenly become prominent; the symptoms and the prominence of the eyeball continued to increase slowly during the next few months, and she became somewhat thinner. On admission she was found to be in good condition, the right orbit was occupied by a tumour apparently fixed to the orbital wall, the eyeball being protruded and disorganised, the conjunctivæ much congested. As far as the tumour could be felt it had a firm, rather elastic feel, and was tender on pressure. After a few days the patient was chloroformed and the protruding eyeball detached by two elliptical incisions. It was then found to be perfectly

flattened and atrophied. Behind it was a tumour, firm and elastic, the size of a small hen's egg. This was entirely dissected out, the walls being slightly adherent to the roof of the orbit; the optic nerve and the orbital muscle were almost completely atrophied. The tumour was then opened and the fluid contents were found to contain echinococci. The cavity of the orbit was stuffed with absorbent cotton and iodoform and bandages applied. Twenty-five days afterwards she was discharged quite well; there was no sign of hydatid disease elsewhere.

Infant Mortality in Bombay: its Causes and Prevention.*

By Assistant Surgeon N. K. Kallianwalla, Demonstrator of Anatomy, Grant Medical College, and in charge of the Out-patient Department for Women and Children, J. J. Hospital.

The waste of infant life in a large city like Bombay, which takes pride in being called the *Urbs Prima in Indis*, amounting to 43 per cent. of the total deaths, need not be insisted upon to enforce the importance of the subject of infant mortality in Bombay, its causes and prevention.

The death-rates of young children are among the most important studies in sanitary science. A child is like a very delicate recording instrument. Its tender young life furnishes a most sensitive test of sanitary circumstances; and therefore a difference in the infantile death-rate of any two localities is a difference in their sanitary condition. Increased infantile mortality indicates generally the districts of most unfavourable conditions and of weak chances of life.

A study or analysis, therefore, of infant mortality in Bombay, means a study of those causes which operate unfavourably upon the health of the general public. Such waste of human life, as forty-three per cent. of total deaths, is deplorable but capable of reduction. It has been reduced to a certain extent by measures of drainage and sanitation, by improvement of house-ventilation, education, formation of more breathing spaces, and so on. I say to a certain extent only, for there are other conditions continuously operating which are difficult of removal and prevention, *viz.*, poverty and its attendant evils.

There is a saying that "a large and healthy population is the life and strength of a nation, and the source of its success in science, art, agriculture, and commerce." There is another which says that "Nations are gathered out of Nurseries,"

* An abstract of the Dosabhoy Hormusji Cama Prize Essay of the University of Bombay.

and a third, that "the physical strength of a nation is a means of national prosperity."

Man should be submitted from his very birth to the laws of hygiene, so as to give him a good start, to strengthen his constitution if it is good, improve it if it is bad; to make him a vigorous citizen, useful to the nation, not only by his own works, but also by bringing forth offspring not unhealthy in their origin; for, as said above, the physical strength of a nation is a means of national prosperity.

Does not, then, the infant claim our first attention? The new-born infant has but a feeble hold upon life, and quickly succumbs to an attack of acute illness, for it is an imperfect being, whose organisation, as yet unfinished, requires to develop itself. Organs hitherto inactive, like the lungs and liver, have to take on their function, have to develop and modify themselves, others have to disappear.

The conditions which determine the structure and growth of the young body are various, of which food, air, light, clothing, cleanliness, and attention to broad facts of hygiene are the most important, in addition to certain peculiarities inherited from the parents, in the form of various latent diseases or diatheses which are specially active in early life. All these conditions determine the possibilities of the child's career.

Infantile mortality may be attributed to two important factors:—(*a*) preventible causes, (*b*) natural causes. The preventible causes which are responsible for a good deal of infantile mortality are the result of poverty and its evils, traditions, superstitions, prejudices, fashion, and ignorance; and mistaken ideas about the anatomy and physiology of the body, leading to erroneous treatment by old women, vaidyas, and hakeems.

I shall here briefly refer to each of the above causes. Take for instance the disease "Scrofula"—one of the most common of the diseased types of constitution met with in the child, a disease of poverty and its ills, combined with neglect of sanitary laws. How many hundreds of children of the poor does

it either prematurely kill, or perhaps spare to lead a life full of misery and troubles; filling up our hospitals and dharamshalas as incurables?

To show what part ignorance or false notions play in the causation of preventible diseases of children, one instance will suffice. Infants require to be clothed warmly, not because their temperature is subnormal, but because they are more liable to catch cold; in other words, their thermic centre is easily affected, they quickly part with their heat, and are chilled. Now there is a prevalent delusive notion amongst ignorant parents, both rich and poor, that by exposing children at an early age to cold, they become "hardened." This hardening process is accountable for a large contribution to infant mortality under the heading of catarrhal affections. To this contribution another is added, also the result of ignorance, of plain laws of nature (seen only among the very poor and ignorant), *viz.*, the habit of covering up the helpless infant's mouth and nostrils even when it has caught cold, thereby depriving it of oxygen at a time when the infant really needs more, when its circulation is feeble and breathing power low. This habit is the result of a superstitious fear that an evil eye may be cast upon the infant. Another instance of the so-called religious custom detrimental to health is to be met with amongst the Parsees. It is the cruel custom of confining the mother with her infant in the darkest, dirtiest, and dampest possible ground floor for a period of 40 days after delivery.

I need not here cite further facts and cases proving that disease, and ultimately death, results not from necessity nor from chance nor accident, but really from the infringement either through wilfulness, or ignorance, or prejudice, of those laws and conditions on the due observance of which the health and welfare of the body depend. Removal of such preventible causes will not only certainly lessen infantile mortality, but also with their removal many of the indigent would become useful and respectable citizens, rather than a burden upon the industrious and upon public charities.

Let us now have a statistical inquiry into the amount of infantile mortality in Bombay. It has been proved beyond doubt that one-fourth of all the children born are cut off within the first five years after birth (*vide* Table **A**), and there is also little room to doubt that much of the mortality is due to the unhealthiness of the majority of the homes of the working classes, the excessive use of stimulants, drugs, and quack medicines; and to practices the result of prejudice, neglect, and ignorance.

Table **A** *—Showing ratio of Deaths under one year to Births.*

Year.	Births.	Deaths of Infants under one year.
1887	100	38·58
1889	100	42·54

The following Statement shows at a glance infant mortality out of total mortality :—

Table **B**—*Showing infant mortality for nine years.*

Year.	Total Births.	Still Births.	Total Deaths.	Deaths of Infants under 5 years.	Percentage of Infant deaths to Total Deaths.	Deaths under one year of age.	Deaths at fifth year.	Percentage of deaths under one year to deaths under five years.	Remarks.
1881	16639	1050	21856	9223	42·1	6349	302	68·8	Famine year.
1882	15366	1594	20468	8901	43·4	4296	165	67·7	
1883	15182	1449	23530	10088	42·8	6582	348	65·2	
1884	14637	1479	22542	9749	43·2	6392	289	65·5	
1885	14964	1347	21850	9504	43·4	6309	273	66·3	
1886	14909	1158	20074	8971	44·6	5962	242	66·4	
1887	15429	1129	20513	8991	43·8	5953	241	66·2	
1888	16760	1182	22421	9620	42·9	6656	251	69·1	
1889	15493	1224	23378	10060	43·03	6591	248	65·5	

It has been also proved that with the progress of sanitary science the yearly death-rate is diminished, and at no period of life is the decrease of mortality more marked than in that of infancy. Many causes combine to bring on such a result *e. g.*, (*a*) legislative enforcement of sanitary laws, (*b*) compulsory improvements in the hygienic surroundings of the poor, (*c*) dissemination of useful knowledge of the care of children, and lastly (*d*) improvement of the social condition of the poor.

As a preliminary to the subject of "Infant Mortality" I must first refer to the "Vital Statistics," which include (*a*) birth-rate, (*b*) sick-rate or morbidity statistics, and (*c*) death-rate or mortality statistics.

Now, the gross death-rate is but one, and an imperfect expression of the health of a town or district; further analysis of mortality statistics, according to age, shows that the deaths of newly born and young children form always a large item in the list, nearly 66·6 per cent. of total infantile mortality (*vide* column 9 in Table **B**). The morbidity, or sick statistics, can never be accurate for obvious reasons. However, some information can be gathered from the records of our hospitals and public dispensaries.

Table **C.**—*Showing amount of sickness of children in* 1889.

J. J. Hospital	8,315
Gokaldas Tejpal Hospital	4,015
Cama Hospital	2,124
C. J. Ophthalmic Hospital	1,337
European General Hospital	749
Total	16,540

The large number of 8,315 children treated at the J. J. Hospital is chiefly derived from the overcrowded localities of Nagpada, Bhendi Bazar, Byculla, Mazagón and Oomercarry. This number 16,540 is, exclusive of another large number of

children treated in private dispensaries, and a still larger number not treated at all, quite sufficient to show the great amount of sickness amongst infants, and the importance of the subject for an essay like the present.

The following table shows the total number of children treated at the J. J. Hospital in the year 1890, and the various diseases for which they were treated :—

Table **D.**—*Total* 8,400, *of which*—

Diseases of Alimentary canal furnish	699	All derived from classes of people very low in the social scale of life.
Respiratory Diseases furnish	1,068	
Skin Diseases ,, ...	1,944	
Intestinal Worms ,, ...	1,023	
Fevers ? ,, ...	1,181	
Scrofulous affections, abscesses, &c..	2,064	

Although the sick-rate cannot for obvious reasons be analysed, the death-rate of a place can be very exhaustively examined to enable us to arrive at definite conclusions as regards the causation of diseases, prevalence of certain diseases in certain localities, the occurrence and virulence of a particular disease in certain classes of people, and so on. But even these mortality statistics of Bombay cannot be relied upon. In the majority of cases they are not worth the paper they are written on, because of the defective system of registration of death; *e.g.*, a death from Pneumonia or Enteritis or Meningitis or Pyæmia will be returned under the heading of Fever, a high temperature being the most marked feature of the disease. So also a specific fever may be returned under the heading of simple fever. However, with all these defects these statistics clearly show the actual number of deaths of children.

Numerically speaking, infant mortality may be divided into five classes—(*a*) nearly half the number die from Atrophy, Debility, Convulsions, Diarrhœa, &c., due to a faulty dietary; (*b*) from Respiratory affections; Pneumonia, Bronchitis, etc., mainly the result of overcrowding, bad ventilation, and want of clothing; (*c*) from infectious diseases; (*d*) a certain number from premature and still births; and (*e*) from accidental causes.

Table **E.**—*Showing causes of death in children under seven years in* 1889.

Diseases.	Under 7 years.	Under one year.	Remarks.
Small-pox	185	116	* Quite unreliable figures; word Fever is a misnomer, only a symptom of various diseases. So also convulsions is only a symptom.
Measles	613	236	
Fevers*	3,488	1,856	
Nervous diseases*.....	1,700	1,609	
Respiratory diseases..	1,789	1,100	
Digestive*	776	305	

Table **F.**—*Showing causes of infant mortality under seven years in different castes and races in* 1889.

Caste.	Small-pox.	Measles.	Fevers.	Nervous diseases.	Respiratory.	Digestive.	Remarks.
Europeans	1	1	9	6	6	32	Taking the ratio of deaths to population, how wonderfully child death-rate is influenced by the high social position of the parents, which implies greater care of the children, is shown in this table by the figures opposite Europeans and Parsees.
Parsees	7	24	180	84	87	67	
Mussulmans	24	58	837	386	512	96	
Hindus	25	435	1,958	1,029	974	434	
Low-Caste Hindus...	14	80	367	131	165	87	
Native Christians...	12	5	91	20	15	41	

I now propose to discuss the causes of each disease or group of diseases of children *seriatim*, and commence with *infectious diseases*, as measles, whooping-cough, small-pox, and cholera.

Measles and whooping-cough are diseases mostly to be met with in overcrowded and filthy localities. They are diseases which spread widely because of filth, imperfect ventilation, and overcrowding. In itself measles is not so fatal as its sequelæ in the form of bronchitis and broncho-pneumonia, enteritis, diarrhœa, and dysentery, which carry off several of its victims; and these complications are in themselves the result of overcrowding and negligence on the part of the poor ignorant parents. In Bombay sources of infection are so very

common that measles is almost every year an epidemic, but, as I have said above, the fact of its being primarily not so dangerous to life, its importance does not appeal to the minds of the masses.

Table **G**—*Showing infantile mortality from measles.*

Year.	Total number of deaths.	Deaths under 7 years.	Deaths under first two years.	Highest mortality by class.
1887	547	518	343	Low caste Hindus and Jains.
1888	221	216	154	
1889	638	610	411	

Whooping-cough often follows an outbreak of measles; the same remarks that we applied to measles, as regards its sequelæ, are applicable here also.

Small-pox.—Of all diseases, small-pox is one which clearly proves that disease and death can be averted by common sense and by the adoption of recognised sanitary precautions. Bombay Infant Mortality from small-pox has certainly decreased since the compulsory enforcement of the Vaccination Act No. I. of 1877. This Act has been in force in Bombay for the last twelve years, and is worked fairly well. A mere glance at the following table shows the blessing conferred on Bombay infant population by the enforcement of the Act.

Table **H**—*Mortality before and after compulsory enforcement of Act.*

Before		*After.*	
Year.	Deaths.	Year.	Deaths.
1850	1,308	1878	357
1852	1,003	1880	207
1854	232	1881	35
1855	1,088	1882	92
1858	1,714	1883	1,461
1861	1,627	1884	112
1864	1,707	1885	55
1869	1,725	1886	19
1872	1,854	1887	108
1876*	3,174*	1888	482
		1889	304

* A year of epidemic and the excessive mortality led to the compulsory enforcement of the Act.

Happily no objection is now raised by parents against getting their children vaccinated, as was observed some ten years ago, though we still come across some objectors amongst the very poor and ignorant; but the masses of people, as a rule, having observed its good effects, are, if anything, only too willing to have their children vaccinated.

Here is an instance where one of the means of preventing infantile mortality, which I am going to suggest later on, *viz.*, improve the social condition of the poor, and educate them on sanitary subjects by lectures and distribution of tracts and pamphlets on sanitary laws, and by reading of sanitary primers in schools and colleges, has proved successful. Vaccination has, no doubt, a great deal to do with the fall in the mortality, particularly infant mortality from small-pox. The equally important remedy of medical treatment of small-pox patients also helps to account for the fall. Time was when small-pox, like cholera, was looked upon by the ignorant masses of people, as a manifestation of divine wrath—the act of a goddess whom they were always afraid of offending by treating small-pox patients. All this is now changed, thanks to civilization and education. Nor should we forget important sanitary improvements by the Municipality, inefficient though they still are, which have also decreased the ravages of the disease. The spread of small-pox, like measles, is aided by general insanitation. Being a specific disease it is capable of very easy transit from one person to another, hence the necessity not only of vaccination but also of removing all causes which give rise to filth and dirt which are the chief media of propagation of the virus. In Bombay small-pox is mostly observed among the children and adult population of Goanese Christians who come from Goa; also amongst the Hindu population, chiefly mill-hands, who come from Ratnagiri and the Konkan. These are most of the unvaccinated. During the year 1889 there were, out of a total small-pox mortality of 304, 185 deaths amongst children under seven years age, of which 143 were deaths of infants under the second year of life. By districts the highest mortality is noticed in Byculla and Dhobi

Talao, the probable reason being that both districts are overcrowded, the former being inhabited by a very large number of unvaccinated mill-operatives, and the latter by unvaccinated Goanese living in "coors" or lodging houses which are always overcrowded.

Fortunately for the child, *Cholera* mortality at a very early period of life is small indeed, as if a certain pabulum which may be necessary for the growth and maintenance of the cholera virus was wanting in the infant's blood.

Table **I**—*Showing mortality under* 12 *years from cholera.*

1887.		1888.		1889.	
Total Deaths.	Under 12 years.	Total Deaths.	Under 12 years.	Total Deaths	Under 12 years.
269	24	379	19	462	52

Having finished discussing diseases under this class, I now come to the second division of diseases of children, *viz., Convulsions, Diarrhœa, and pulmonary affections.* The causes of these diseases are various, operating severally or combined; thus, abrupt changes in temperature and imperfect protection against cold, favour inflammation of the lungs and air passages, or improper food or mis-management in dieting produces diarrhœa, especially among the children of the poor, or the irritation of teething, and many other temporary influences favour convulsions. An infant's nervous system is highly impressionable, and excitable, and hence any irritation in any part of the body is likely to have a response from the excitable nervous system in the shape of convulsions. The word "convulsions" is a misnomer, for convulsions in a child is merely a symptom of a general disorder: for example, the cold stage of ague is replaced by convulsions. So also irritation of teething, or tubercular meningitis; or irritation of the alimentary canal by indigestible food, hard fæcal masses, worms, or diarrhœa; or injury to skin, such as burns; in short, any irritation may bring on convulsions. Most of these causes

are diseases of privation, dirty habits, and overcrowding, and therefore nervous disorders of infants, by which we imply convulsions, may truly be said to be the result of dirt and poverty.

Table **J**—*Showing mortality from nervous disorders.*

Years.	Total Deaths.	Deaths under 7 years.	Deaths under 1st year.
1887	1,981	1,564	1,472
1888	1,966	1,490	1,415
1889	2,122	1,700	1,609

This table shows the relative frequency of nervous diseases in children under one year of age, but these figures are not accurate ; for a great number may be cases of tubercle or digestive disorders, although returned under this table because of convulsions being the most marked feature of the illness. Deaths from tubercular and other inflammatory affections of the respiratory organs, too, are to an extent preventible. They are the result of overcrowding, living in a close ill-ventilated locality, privation, and want of clothing. The diseases common to the infant are catarrh, bronchitis, and pneumonia. Unfortunately in the Health Officer's Reports, mortality from respiratory affections is not analysed as to its causes according to age, the reason being that a large number of children die without having been seen by a medical man.

Table **K**—*Infant mortality from respiratory affections.*

Year.	Total Deaths.	Deaths under 7 years.	Deaths under 1st year.
1887	3,886	1,896	1,158
1888	4,132	1,250	1,952
1889	3,942	1,789	1,000

Diarrhœa and other Digestive Disorders are diseases due to accumulation of dirt and filth, defective drainage, non-removal in time of house sweepings, which leads to fetid emanations, partly to outdoor engagement of mothers, privation and poverty leading to improper feeding and improper medications.

Table **L**—*Infant mortality from digestive affections.*

Year.	Total Deaths.	Deaths under 7 years.	Under 1st year.
1887	2,228	839	382
1888	2,265	784	320
1889	2,275	776	305

Mortality according to class is highest in the children of the very poor. These figures, however, are not quite accurate, they should be more than given here, since a large number of deaths of children from diarrhœa are returned under the headings of fever or convulsions.

The causes of digestive disturbances may then be summarised under two headings, namely, common sanitary defects, and poverty of parents leading to outdoor occupation of mothers. Bombay being such a large manufacturing town, the constant engagement of mothers away from home, in various branches of industry, leads to improper feeding of infants, and a consequent excess of fatal infantile diarrhœa. Where mothers are engaged in factories or on outdoor labour, infants who should be at the breast are ill-fed or starved at home, and their cries of hunger are quieted by narcotics and stimulants, so freely used in Bombay under the name of "Balgolis." Factory women, and those employed in our docks, or on buildings in course of erection, soon return to employment after delivery, for they cannot afford to stay at home and away from work for any length of time. Poverty and privation stare them in the face. No doubt their husbands do work and earn, but their income is not sufficient—a great part of it is probably taken away by the Marwari who may be seen near

the gate of the factory, watching for his debtor on each pay-day; and part possibly goes to the liqour seller, who is invariably the next-door neighbour of the factory, or even if the husband be temperate, his income is insufficient for the family wants; he needs a greater share of food to enable him to work; under these circumstances the poor mother also must work, and consequently absence from work means starvation. The mother therefore returns to work soon after confinement. The unfortunate woman is compelled to get up early to prepare food for her husband and herself. In the mill or in her outdoor work, she is employed for nearly the whole day, she cannot leave to go home and attend to her infant till late in the evening. The unfortunate infant is suckled in the early morning and that too hastily, and then late in the evening and at night; and on none of these occasions does the infant take the breast properly, it forgets the habit, and not only that, the milk itself is altered in quality as well as in quantity, and because of the comparative functional inactivity of the breasts they very soon atrophy. The second link in the chain of causes is the diseased condition of the infant's alimentary canal. During the mother's absence from home the infant is entrusted to the care of a young girl or to an old matron, by whom the child is hand-fed if pouring some kind of food down the infant's gullet can be called so, or perhaps the little thing itself swallows from sheer hunger any thing that is given to it.

There is one remedy for this, and that is the establishment of Nursery rooms in or near the factories, where mothers might leave their infants, and as often as necessary see them and nurse them.

And here I must digress a little. It is not that the children of working women only are thus neglected, even the children of comparatively well-to-do mothers who stay at home are improperly fed. These mothers are anxious to fatten their children, to see them plump, and their idea of nourishing a child is to feed the child very often in the day, or feed it upon anything and every thing, at a time when the infant's alimentary tract

is not prepared to receive such improper food. Having constantly to see and treat sick children of the poor, I have observed babies, a year old, and even younger, swallow or rather bolt pieces of jowary-bread, rice, dall, sweets, plantains, &c. It then stands to reason that illness is the natural consequence of this unnatural mode of feeding infants. Poverty excludes, from the dietary of the infant, cow's or buffalo's milk, the next substitute for mother's milk. As for bad milk and its ill effects on children, I shall speak later on. The result of such unnatural feeding is lienteric diarrhœa leading on to dysentery and catarrhal condition of the bowels, and with it a catarrhal condition of respiratory mucous membrane, convulsions, the resulting mal-nutrition leading to atrophy and death.

It will be seen then that diverse agencies impair the growing frame of the infant. First of all, poverty and its results, faulty feeding and faulty hygiene. Insufficient or unsuitable food stints the body of necessary nourishment, inadequate supply of fresh air renders assimilation defective and the digestive power weak; the infant breathes a tainted atmosphere and derives its only nourishment from the watery breast milk of a weakly mother; or from substitutes for the mother's milk, such as gruel, or various other indigestible starchy foods. This finishes the second link; add to it the third one—namely, that when the child falling into bad health becomes peevish and restless, and cries both day and night; then steps in to the aid of the mother or the girl in charge, that so-called "Gift of God," justly so called by medical men, but that "Curse of God" when misused by ignorant parents. To allay the infants' cries, which are mistaken for cries of hunger, some indigestible stuff is poured down its throat, or a "balgoli" or dose of crude opium is given.

Being in charge of an important institution for women and children and constantly coming in contact with such parents and such infants, I made it a point to inquire into the history of every sick infant that was brought to me for treatment, and from the statistics I collected, I found that 40 per cent. of the children were victims of this pernicious habit of opium-

eating. From the very look of the child one is enabled to at once pronounce it to be suffering from chronic opium-narcosis. It looks prematurely old, with all the facial lines well developed, and is in a state of stupor. How often have I dissuaded parents from giving opium to their children, and how complacently have they replied, "How can we go to work leaving the child at home the whole day long crying; and can we be expected to work the whole day for our family if our sleep were disturbed at night by the child's cries, if we did not give opium." They evidently regarded my objection to giving opium to young children as mere stupidity on my part.

The "balgoli," literally meaning the child's pill, is made up of aromatics and opium. Its composition varies according to the fancy of the person who sells it. This opium-giving habit is brought about thus—A child healthy at birth, rapidly wastes under bad feeding and suffers from diarrhœa, and flatulence and vomiting. The parents often have no time to take the child to the hospital in the morning, for they must attend to their work (proving the necessity of factory dispensaries) or they have a prejudice against English medicine. They, therefore, consult an old woman who generally suggests opium. It at first stops the diarrhœa, but increases the disinclination for food and produces mal-nutrition. The child thus gets into the habit of opium-eating and will never rest without it, and the habit is very difficult to break off; for very obstinate diarrhœa sets in on the cessation of the use of opium. Unfortunately, this habit of giving opium to young children is not confined to the poorest of the working classes only. I have seen it among the middle class of Hindus and Mussalmans. The Parsees are the only people who are exempted from the evil, except perhaps the furtive administration of the drug by ayahs, in order to keep their charge quiet and save themselves trouble. A common habit with these women is to keep a little opium under the finger nail and put the finger in the child's mouth to suck. To ascertain the extent of this opium-giving habit, one has to

stand near one of our retail opium shops, or a grocer's shop, any evening, particularly in Null Bazaar, and count the number of customers buying opium.

We often hear of Coroner's inquests held on the bodies of little children, said to have died of accidental opium poisoning, either by the child getting hold of the opium box and swallowing a lump out of it, or by the mother unknowingly giving an overdose. There are but few cases which are known to the public. How many children must yearly die of chronic opium poisoning whose death is attributed to fever, diarrhœa, &c.

To this mismanagement in feeding and its consequent evils, including the pernicious habit of opium-giving, the fourth link in the chain of causation of diarrhœa—insanitary dwellings and surroundings—may be added.

I proceed to give here a short account of one of these houses and its interior arrangements. One has to only look at the rows of buildings in the cross-lanes of Kamathipoora, Bhuleshwar, Chakla, Nagpara, Khara Talao, or Mandvi, or even at some of the Parsee quarters of the Fort and Dhobi-Talao. It is generally one large house, on three sides of which there are other buildings; one side only is open, with rows of small rooms, each rented by a family or two. It is their bed-room, their urinal, their cook-room. The room has, perhaps, not been white-washed since the house was built, or perhaps when the Municipal Inspector's attention was drawn to it on the occasion of the death of a cholera patient. It is a room where the rays of the sun never penetrate, where there is no free circulation of air, where the nooks and corners contain any amount of invisible dirt and filth, invisible because of the darkness. It is a room where the atmosphere is saturated with carbonic acid by the breathing of some half-a-dozen people sleeping with the door closed; where there is a very offensive smell; where breathing is carried on with difficulty because of the enclosed smoke and excess of carbonic acid. In short, it is a room where birth and death go on side by side, where the mother in her con-

finement and the child suffering from whooping cough or small-pox are not separated. It is in Parsee quarters, a house where the ground floor is dark and damp, with a well and privies close by, and it is here where the Parsee woman gives birth to her offspring, and is confined for forty days in a corner, from which daylight and air are excluded by a thick screen, and where a light is kept burning day and night at least ten days. The evil results of all this may be imagined.

The last link in the chain that requires discussion is neglect of the personal hygiene of the infant. As regards clothing, besides the fact that poverty entails scanty covering, ignorance or stupid notions or fashion about the clothing of infants and their so-called hardening, are also responsible for respiratory affections. As for washing and bathing, it is unfortunately a good deal neglected, as is proved by a very large number of children being annually treated for scabies, eczema, and other skin affections. The primary object of a bath is cleanliness and regulation of the action of the skin. By the abolition of the functions of the skin, extra work is thrown on the alimentary and respiratory tracts, and hence a catarrhal condition of the bowels and bronchi is induced, or at least predisposed to. But, for this neglect in watching children, parents are not alone to be blamed. Pressure of time, scarcity of water, and intermittent supply of water at awkward times, are the predisposing causes of this neglect. In Bombay unrestricted water-supply is unfortunately still a great desideratum; for how can advancement and civilization of the poor exist without it? Want of water is one of the chief factors of filth and degradation.

Before I leave the subject of digestive disorders I would refer to bad milk and its ill effects on health. In connection with the diet of infants, milk claims our first attention. The poor mother, before her infant is perhaps a year old, again conceives, which decreases the quantity and quality of her milk, and as a result of that the infant is in many cases hand-fed on a scanty supply of the milk of cows or buffaloes. How many chances are there for the propagation of disease and death by the milk of

diseased animals? On no question of social economy is the general public of Bombay more ignorant than on that of the wholesomeness or otherwise of the milk they give their children, and, on that ground alone, it is incumbent upon the responsible sanitary authorities to guard the public against abuse and injury. And seeing that milk enters so largely into the daily food of children as well as adults, it is reasonable that some sort of guarantee should be given that the milk sold is wholesome, nutritious, and absolutely harmless. It is certainly a very rare thing, indeed, to hear of the prosecution of dairy men for selling milk of diseased animals, or milk rendered impure by adulteration with water from some unreliable source.

Now, there is a mass of evidence to prove beyond doubt that the consumption of the milk of tubercular cattle, by human beings, has proved dangerous to life. Imagine, then, the evil consequences that the ingestion of such milk may be giving rise to in Bombay amongst the children of the poor, who are already subjected to grossly insanitary conditions and bad feeding. Looking at the wretched state in which most of our milch-cattle stables are kept, ill-ventilated and ill-drained, unpaved and overcrowded, situated in populous localities, with the cattle fed on the coarsest food, often stable refuse, and watered from the nearest dirty pond or tank, and without any supervision by a scientific Inspector, it would not be wonderful if we were informed that a large number of the milch-cattle in Bombay were suffering from tubercular disease. Diagnosis of tuberculosis in cattle is not an easy thing; indeed, in advanced tuberculosis many animals look in good health.

In view of this and other dangers to human life connected with impure or diseased milk-supply, it seems a strange thing that, notwithstanding the presence of so many medical and scientific men on our Corporation, it has never occurred to any of them to bring forward the question for discussion. I have no doubt that if it were discussed in right earnest, and the risks of disease being conveyed through the medium of milk impressed upon the mind of the lay

members, it would at once enlist the sympathy and attention it deserves.

Having spoken at some length upon the causes of infantile mortality from diarrhœa, dysentery and other digestive disturbances, and having touched upon the subject of diet, and the surrounding and personal hygiene of the infants, I now come to the fourth class of diseases of children, *viz.*, fevers. The word fever is a bad and misleading term as regards mortality returns in this country. With the ignorant masses of people, fever is the most significant disease.

Whether it is specific, as in typhus or typhoid, or merely symptomatic of a respiratory or digestive disorder, as in pneumonia or enteritis, it is after all fever which in their judgment has killed the child, and the death is registered as "Death from fever." This fact accounts for the very large number of deaths shown in the Health Officer's returns under this heading. For the same reason the registration of fever types cannot be considered exact.

Table **M**—*Showing mortality from Fever.*

Year.	Total deaths.	Deaths under 7 years.	Deaths under one year.
1887	5,612	2,795	1,563
1888	6,642	3,285	1,923
1889	7,266	3,488	1,856

The following table, **N**, shows the rate of mortality per mille from fevers in the different districts of Bombay :—

District.	1887.	1889.
Chakla	11·28 per mille.	11·22 per mille.
Khara Talao	9·41 „	12·37 „
Mahalaxmi	11·07 „	13·47 „
Kamattipoora	11·05 „	13·43 „
Parel	11·69 „	21·49 „
Sewree	10·44 „	16·20 „
Colaba, Walkeshwar, Chowpaty, least	.....	.....

This table shows that fever is most prevalent in ill-drained localities like Parel, Sewree, and Mahalaxmi, next in drained but overcrowded localities populated by the poorer classes, least in well-drained sloping localities, not overcrowded and populated by persons in a higher scale of life social life.

The last important disease which affects infant life in Bombay, is scrofula. The wide prevalence of this disease and its various manifestations is aided by weak digestion, defective assimilation and excretion, repeated exposure to cold, unsuitable or insufficient food, breathing a foul atmosphere in ill-ventilated, dark and closed rooms, and want of out-door recreation: the latter chiefly from the absence of large open spaces or gardens reserved as "lungs" for the inhabitants of thickly-crowded localities, and partly also to the inherent dread of taking infants out in the open air. It is this scrofula which either kills so many children prematurely, or passes as a hereditary curse to the offspring of those who, under such unnatural conditions, attain to maturity and the power of procreation. A large number of infants die annually from scrofulous lesions, such as abscesses, otorrhœa, meningitis, caries of bone, &c., but they are returned under some other heading, as fever, convulsions, &c.

Putting aside deaths from opium-poisoning, accidental deaths in children are comparatively few. These depend upon the domestic habits of parents, chiefly among the poorer classes, where the children are not so carefully watched as amongst the rich—generally amongst children which are left at home by mothers engaged in out-door labour. The following Table O shows the causes of accidental deaths of 34 children under ten years of age upon whom coroner's inquests were held in the year 1890:—

Accidental drowning in tanks, ponds, &c.	9
Burns and scalds by clothes taking fire from open lights or while playing with matches	2
Fall out of windows	8
Fall into a sewer	1
Fall of timber, planks, &c.	2
Run over by vehicles	12

It may be urged that this paper has nothing to do with still-births. My object, however, in making a few remarks on the matter is to show that infant life, or rather the chances of infant life, depend not alone on circumstances surrounding the infant after its birth, but also upon the circumstances or influences under which it exists before birth. The infant is born with a constitution, good or bad, according to the constitution of the parents. The general conduct of women during pregnancy, then, requires a good deal of attention, as the subsequent health, or the chances of life of their offspring, very much depend upon the way in which mothers manage themselves during pregnancy. The notorious mismanagement, during pregnancy, of poor women, is thus an important, though an indirect cause of infant mortality.

Amongst other influences unfavourable to infant life is the attendence of unskilled midwives on women during their confinement. I believe in addition to the part played by syphilis in the causation of still-births, the above fact of attendance of ignorant dais, or nurses, on women during labour, has also considerable influence on the number of still-births.

I now come to the important subject of prevention of infant mortality. It is true that we do not require any law like the "Infant-life Protection Act" in force in England—thanks to the absence in Bombay of the pernicious systems of baby farming and infant life insurance. Our aim, by the enforcement of general sanitary measures, is to prevent disease: remove the cause and the effects will disappear.

Let us, then, once again enumerate the causes of infant mortality in Bombay.

These are:—(*a*) Poverty and its necessary evils; (*b*) neglect of broad sanitary precautions; (*c*) domestic or social habits of the poor which are often opposed to the doctrines of hygiene; and (*d*) traditions, superstitions, and prejudices of ignorant parents. They have all been discussed in detail in the first part of this paper, and they indicate for their antidotes the neccesity of—(*a*) improvement of the social condition of the

poor; (*b*) legislative enforcement of sanitary laws and compulsory improvements in the hygienic surroundings of the poor; (*c*) education of the masses of the people; and (*d*) dissemination amongst them of useful knowledge of the care of children by means of lectures, and by publication of tracts and pamphlets, in the simplest language, on hygienic subjects.

Poverty and its evils.—I have already defined what we mean by poverty. It is not dearth of food alone, for long before that is felt there is want of clothing and want of house-room, leading to overcrowding in already crowded localities. How is poverty to be prevented? This is not an essay on poverty nor on socialism; and socialists even cannot, with all their efforts, succeed in making the poor rich. But, surely, if poverty cannot be remedied, the evils attendant upon it can be mitigated, if not extirpated.

Improve the social habits of the poor.—Impress upon their minds the necessity of cleanly habits; let them know by means of lectures and tracts the economy of cleanly habits and better house accommodation; teach them the advantages of temperance, the advantages accruing from observing not only the laws of mortality, but also of hygiene, which mean less sickness with greater capacity to earn more and to save more. In other words, fit them for a better life; for it is not only the father and mother who are thus saved and improved but also their children. We need enforcement of sanitary laws, and compulsory improvements in the hygienic surroundings of the poor.

Prevent overcrowding.—There should be house regulations which should insist not only upon the observance of sanitary engineering rules in the erection of buildings, but also require that only a certain number of people be allowed to occupy a house or a chawl. For how many houses and chawls are there in Bombay, dark and filthy, closed in on three sides by higher buildings, where the defects in construction prevent the entrance of light and air, and the infants breathe an atmosphere fetid with the stagnant exhalations of a number of people. Even the cattle and horses of the rich are kept in better condition than the infants of the poor. Such houses in

themselves are quite sufficient to propagate and cause sickness and mortality without the further help of insufficient light and air, insufficient water-supply, defective drainage, dirt and filth, and bad food. Here exist evils which can be certainly remedied by the Municipality. If the Municipality were to insist upon certain sanitary engineering conditions being observed in the construction of those "Jerry" buildings which spring up like mushrooms in our city; if they were to visit upon the landlord the responsibility for overcrowding; if the Corporation were to buy and pull down such buildings and impediments as obstructed the circulation of air in close gullies; if they were to reserve open spaces to increase the breathing-room of the neighbourhood, then certainly one important factor in the excessive sickness and mortality of infants would be removed.

Every year now adds to the relative growth of our city. With the increase of trade and manufacturing industries, and with the increasing difficulties of the indigent outside Bombay, there is an annual influx into the city of the working classes. But sanitary measures and house accommodation, corresponding to the increase in population, are not progressing. Hence overcrowding, and that too in already crowded localities. Such overcrowding is the result, not alone of want of house accommodation, but also of the unwillingness of the people to live far from centres of labour and commerce, and to want of easy approach from a distance to such centres of occupation.

The other causes, besides poverty, which lead to infant mortality are traditions, superstitions, prejudice, ignorance of the broad facts of hygiene and mistaken notions about the physiology and anatomy of the body and about diseases, leading to erroneous treatment. These are being remedied by the effects of civilization and education. It is this education which will excite in the minds of the poor some feeling of self-interest; which will lead them to do and observe things which are good for them, and put aside those which are bad. Such self-interest, for example, as will make the workers ask

for nursery-rooms and dispensaries in connection with the factories where they are employed.

There is still another important measure which, in the interests of the infant population of Bombay, seems worthy of consideration. I think that a system of District Medical Officers, something like the system of Union or Parish doctors in England, ought to be established. Speaking of mortality returns, I have said that they are not worth the paper they are written on, since the whole system of registration of deaths is defective in its very foundation. Deaths are correctly recorded in the hospitals, but most of those recorded at the various burial and burning grounds are misleading as to their causes. If every death necessitated a medical certificate, then only could the returns be trusted. If the system I suggest, of District Medical Officer, were established, these would not only attend upon the sick poor of the various districts, but would also certify as to the cause of death. Many hundreds of infants who are now being slowly poisoned by quack medicines and "balgolis," would be annually saved by the compulsory requirement of a death certificate from a qualified medical man, since the parents would then be obliged to resort to the doctor of their district for treatment.

But it is little use making laws if they are not to be strictly observed by the great mass of the people. There was, there is, and perhaps there always will be, a certain amount of apathy amongst the masses towards sanitary legislation. Legal compulsion will never remove this apathy. What is most required is education of the masses—education, and education alone. Teach the poor to help themselves. That, more than anything else, will strike at the root of Povery, Misery, and Disease. In conclusion, I once more repeat— improve the social habits of the poor. Improve the parents, and the offspring will improve, and that is the most effectual way to attain our object of removing the causes of the excessive infant mortality of Bombay.

Surgical Cases.

By H. M. Masina, L. M. & S., Honorary Surgeon, J. J. Hospital.

I.—*Tropical hepatic abscess—Free incision—Recovery.*

Mohidin Shahabudin, aged 48, a Mahomedan ; by occupation a butler; born in the Konkan, having no fixed residence, was admitted into the hospital on the 11th April 1890 for fever, pain and tenderness in the right hypochondriac region.

History.—The complaint is of a month's duration; commenced gradually with febrile disturbance, followed by pain and tenderness in the right hypochondriac region.

Previous history.—Being a butler had to move about with his master in different parts of India and Burmah, and was thus exposed to climatic changes. No history of fever of any sort previous to the onset of the present complaint; no history of dysentery.

Habits.—Never tasted any alcoholic beverages ; never had been an excessive eater, or a glutton ; indulged in very strong tea ; smoked tobacco moderately.

Present condition.—Middle-aged man, fairly nourished. Temperature in the afternoon varying from 100° to 103°; morning temperature being normal and at times subnormal ; pulse varying with the temperature; occasional wheezing heard at bases of both the lungs.

Digestive system.—Gums scorbutic; tongue moist, small, coated in the centre; red at the tip and edges; appetite impaired ; *no jaundice* ; no vomiting ; bowels regular ; spleen slightly enlarged.

Hepatic measurements—

In the	median	line	3½ inches.
,,	nipple	,,	5½ ,,
,,	mid-axillary	,,	6 ,,
,,	scapular	,,	5½ ,,

Sharp cutting pain and tenderness on percussion and manipulation in the hypochondriac region, especially noticed

at the costal arch in the axillary line; the pain was reflected to the inter-scapular region.

Urine.—High coloured; no albumen, no sugar.

Indications for operation.—The afternoon exacerbations of fever coming on with chills and rigors; the hepatic enlargement with pain and tenderness in the hepatic region, particularly marked at the costal arch in the axillary line, the failure of ordinary medicinal treatment with quinine, salines, mineral acid and ammonium chloride, and the exposure of the patient to climatic influences as indicated by the history, were found to be sufficient indications for the presence of suppuration and hepatic abscess and early surgical interference.

Operation (*April 16th*).—The patient was chloroformed, and the second size trocar and canula of the aspirator was introduced into the hepatic region in the eighth inter-costal space in the mid-axillary line, and a large quantity of greenish yellow pus removed. A free incision was then made at the point of insertion of the needle and two pieces of drainage tube were put in; a pad of carbolized tow and cotton being applied over the wound; the abscess cavity was not washed out at the time of the operation. The patient was given an opiate and put to bed.

There was subsequently free discharge of pus containing a large quantity of bile, and the abscess cavity was syringed out once a day, sometimes with carbolic lotion and at other times with iodine lotion, the lotion being injected through one tube, which acted as an inlet, and coming out through the other. The patient made a good recovery and was discharged on the 22nd of June 1890, the drainage tubes being removed on the 13th of the same month.

Remarks.—This was a case of hepatic abscess due solely to the influence of tropical climate as shown in the history; it also showed the beneficial effects of an early free incision after the detection of pus.

II.—*Mycetoma—not endemic to India, but occurring in Persia—extending up to the thigh—amputation through the right knee.*

Abdul Awaj, a Persian, aged 30; a beggar, was admitted into

the Hospital on the 18th of August 1890, for extensive swelling of the right foot. The complaint was of three years' duration and came on gradually, commencing as a small nodule on the front part of the sole of the right foot; the nodule gradually grew soft and burst, discharging along with the pus pale yellow granules characteristic of the pale variety of mycetoma. Similar nodules began to form almost all over the foot, which latter grew of an enormous size, nearly five times the size of the healthy foot, and the whole mass was riddled with sinuses discharging pale granules. There were nearly 100 openings in the foot; there were two nodules situated about the middle of the inner surface of the tibia, and apparently leading down to the bones, which necessitated the removal of the limb through the knee joint. In addition to this there were two nodules situated on the inner and posterior aspect of the lower third of the thigh, involving only the skin. The only local symptom complained of by the patient was the inconvenience caused by the unwieldy size of the limb (foot) and a burning pain, worse at night.

Operation.—The patient was in a very feeble state of health, almost unfit for operation, and had to undergo a lengthened preparation for it. He was admitted on the 18th of October and operated on on the 5th of November. During all this time the whole of the limb was washed every day with carbolic lotion, a general bath being also occasionally given. He was fed up and had to be given an opiate at bed-time.

On the morning of the 5th of November he was put under chloroform, which he took well. The limb was disarticulated by the double flap method, one anterior and the other posterior. The flaps were first marked out skin-deep with a scalpel, the anterior flap extending from the prominent portion of the condyles of the femur to about three inches below the tubercle of the tibia; the posterior flap was marked out nearly an inch and a half longer than the anterior. The posterior flap also included the muscles which were transfixed from within outwards. After the limb was disarticulated, the muscles and lymphatics in the popliteal space were all found affected with

the disease and had to be dissected out; a circular portion of the diseased skin at the inner and back part of the thigh had also to be removed; the disease extended up the back of the thigh, chiefly along the lymphatics which were dissected off as far as possible.

The patella had to be removed as the flaps were found to be somewhat short after the removal of the skin at the thigh. The parts were washed with carbolic and perchloride of mercury lotions, dusted over with iodoform, and the wound closed with interrupted silver wire sutures, a drainage tube having been put in. All bleeding points were checked in the usual way, a double ligature being put round the popliteal artery. The stump was dressed with iodoform, boric cotton, carbolized oakum and roller bandage, and fixed in a box-splint.

The stump healed up by the first intention, notwithstanding the amount of dissection which was had recourse to. The dressings were changed for the first time on the 16th, *i.e.*, 12 days after the operation, the drainage tubes shortened and some of the sutures removed. All the sutures were removed on the 21st of November, and the patient was discharged on the 11th of December. There was no rise of temperature after the operation.

Remarks.—The interesting features of the case are:—

1. That the disease is found in Persia, and is not solely endemic to India; 2. The extensive nature of the disease—even the inguinal glands being somewhat affected; and 3, that the disease travelled chiefly along the lymphatic, and invaded lymphadenoid tissue tracts.

III.—*Left Empyema—bursting externally—resection of the 7th rib—recovery.*

Soomar Husain, a Mahomedan, aged 23 years; a hawker living at Dhoraji, in Kathiawar, was admitted on the 24th of November 1890 with all the physical signs and symptoms of fluid in the whole of the left pleural cavity, except at the apex. The diagnosis as to the nature of the fluid being pus was arrived at by the free escape on coughing of pus from an opening

situated in the sixth intercostal space nearly at the junction of the ribs with their cartilages. In addition to this opening there were two more,—one over the fifth rib and another between the last two. These latter openings did not communicate with the pleura, but only led to superficial sinuses communicating with the opening in the sixth intercostal space. There was no febrile action to speak of, the temperature rising only to 99·6° F., respirations 23 per minute, pulse 93, very feeble; urine free from sugar and albumen. The duration of the disease, as stated by the patient, was 24 months.

Operation.—On the 3rd December patient was chloroformed and a long probe was introduced into the pleural cavity through the opening situated in the sixth intercostal space; the probe went upwards and backwards and moved about pretty freely; the opening was then enlarged to the extent of about an inch, when a small quantity of greenish pus came out. An attempt was made to explore the pleural cavity with the finger but to no purpose, as the intercostal space would not admit the finger on account of the very close approximation of the ribs. For free drainage of the pleural cavity, it was thought desirable to excise a portion of a rib; accordingly the seventh rib was cleared of the soft tissues by a triangular flap of skin and muscles in contact with the rib, the apex of the triangle looking downwards and backwards and the base towards the sternum; a piece of the seventh rib, measuring about an inch and a half, was partially sawn off with a finger-saw close to the costo-chondral articulation and removed with a bone-nipper; on doing this the pleural cavity could be freely explored with the finger; the cavity was then gently washed out with warm carbolic lotion and two pieces of drainage tubing were put in, the flap sutured and a pad of lint sprinkled over with iodoform and oakum was fixed to the part with a many-tailed bandage. The dressings were changed twice a day for the first few days, and then once daily, the pleural cavity being washed out with warm carbolic and mercurial lotion which was injected through one tube which acted as an inlet tube and came out through the other which acted as an exit tube. This method of using

two pieces of tubing in draining the cavity greatly facilitates complete washing and averted the shock to the system which sometimes occurs when the pleural cavity is washed by injecting the lotion and letting it come out only through one piece of tubing.

The patient made a good recovery; the drainage tubes were removed on the 5th of January 1891. The heart sounds and respiratory sounds returning as the cavity of the pleura closed up.

IV.—Popliteal Aneurysm simulating diffuse cellulitis in the Popliteal space—Ligature of superficial femoral at the apex of Scarpa's Triangle—Dry Gangrene of the Toes —Recovery.

Anand Bhima, aged 38 years, a Hindu, by occupation a petty grain-dealer, and having to lift heavy weights, was first seen as a private patient for a swelling in the right Popliteal region, extending towards the inner and upper aspect of the knee; the swelling was somewhat hot, exceedingly painful and tender, and the skin over it was livid and congested, no pulsation was felt, and there was a sense of deep-seated fluctuation. According to the patient's statement, the complaint was of only 20 days' duration. This statement of the duration of the disease was made by the patient just before the operation, but on cross-examining his relations after the operation, it was found that he had been ailing with pain and stiffness in the knee for over six months. The pain complained of was of a burning and throbbing character, and greatly disturbed the patient's sleep at night, so much so that he had passed three or four altogether sleepless nights before the operation. There was slight œdema of the right foot and leg, the long saphena vein standing out more prominent than usual and looking diliated but not varicose. The swelling on the whole presented the characteristics of diffused cellulitis in the Popliteal space.

Operation, 12th September 1891.—As there was only a sense of deep-seated fluctuation, an exploratory puncture was made with a grooved needle and a hypodermic syringe, the result

being nil, that no pus came out; only dark venous blood flowed through the punctures; the blood did not coagulate; a puncture was then made with a tenotomy knife which was followed by free bleeding.

The absence of pus, the situation of the swelling, and the hemorrhage after the puncture, led to the presumption of the case being one of Diffused Popliteal Aneurysm. Esmarch's tourniquet was then applied to the thigh at its upper part and the puncture made in the popliteal space was freely enlarged, and on introducing the finger, the whole of the popliteals pace was found filled with blood clots, which on removal were found, some quite fresh, and the others old, the fibrin forming distinct layers. The sac was quite in contact with the femur, which was not in any way affected. The sac was then washed out with carbolic and perchloride of mercury lotions, iodoform rubbed in, and the cavity stuffed with strips of lint squeezed out of mercurial lotion; a thick pad of boric and absorbent cotton was then firmly fixed to the part with a roller bandage. On removing the tourniquet, there was free arterial hemorrhage necessitating the re-application of the tourniquet, all this was done, outside the Hospital, the patient being under chloroform.

The free arterial hemorrhage necessitated ligature of the femoral artery; but as there were no skilled assistants at hand, and as the patient was not well off, he was removed to Hospital.

The patient was re-chloroformed, and ligature of the superficial femoral at the apex of Scarpa's triangle decided on. A silk ligature was then applied to the vessel here which was secured without difficulty or accident. The tourniquet was relaxed to see the effect of the ligature on the hemorrhage from the aneurysm; but the moment this was done, it set in again as feeely as before. The tourniquet was immediately re-applied, and the incision in the sac was freely enlarged in order to search for the bleeding point. This was found to be the upper opening of the sac, that is, the opening of the supplying artery; and was situated at the posterior and outer aspect of the sac. It was then determined

to dissect off the sac and tie the supplying end of the vessel; but this after a short attempt was found to be impracticable on account of the adhesions present, the want of proper light and the delay and hemorrhage that had already taken place. A probe was introduced into the opening and passed up the vessel as a guide, and the artery, and the soft parts surrounding it, were then secured in one mass by passing a nævus needle round them armed with a stout catgut ligature. On this being tightened the hemorrhage at once ceased.

The popliteal vein was punctured in the attempt to dissect up the sac and had to be ligatured also. The tourniquet being removed no further hemorrhage occurred. The sac was then re-dressed as described after the first incision.

The wound for the ligature of the superficial femoral was closed with interrupted silver wire sutures, due antiseptic precautions having been taken; no drainage tube was used. The limb was then wrapped up in ordinary cotton with a warm blanket over all and kept in an extended position. A full dose of morphia was injected soon after the operation.

It may be mentioned that the operation was performed in the evening, with the aid of very indifferent gas light. The patient bore the chloroform well.

The following notes of the progress of the case were recorded:—

September 13*th*.—Had a fair night's rest; temperature in the morning 100·2°., pulse 136 per minute, soft and feeble; the right radial pulse was markedly feebler than the left; there were no clinical facts or signs to explain the anomaly.

The toes feel cold, cutaneous sensibility greatly diminished, dressings dry; the following mixture given:—

Re.—

Tinct. Opii., m. 40
Tinct. Digitalis., m. 30
Aqua Chloroform ad., oz. iv.
1 oz. every four hours.

Milk and beef-tea given as nourishment.

September 14*th.*—Nothing unusual noticed; evening temperature 102·6°, toes do not feel quite so cold; a decided difference in the local warmth at the ankle and the toes.

September 15*th*—19*th.*—Temperature varied between 100° and 102°.

September 21*st.*—Temperature normal, complains of pain in the toes which the patient cannot well describe; the difference of warmth at the ankle and toes still noticed.

September 22*nd.*—Dressings were removed for the first time. The wound for the ligature of the superficial femoral was found healed by first intention. The aneurysmal sac granulating. There was nothing particular locally to account for the rise of temperature noticed above. The sac redressed as on the first occasion.

September 24*th.*—Patient delirious for the last two nights; the dressings were removed, the sac washed out and all iodoform was removed as far as practicable, the wound dressed with boracic acid powder. Bromide of potassium given internally.

September 30*th.*—The delirium gradually disappeared.

The skin of the toes up to the middle of metatarsal bones or middle of instep presents a livid colour; the toes feel quite cold and the patient complains of a cutting pain in the parts.

October 1*th.*—A bedsore formed on the sacrum.

October 15*th.*—The epidermis of the sole of the foot gradually exfoliated and a line of demarcation formed just beyond the toes and went right round the foot, the toes being in a state of typical dry gangrene.

December.—The sac granulated and healed up about the third week of December; the nectosed toes separating. General health, good.

Prominent features of the case:—

1. No reliable history could be obtained from the patient.
2. No history of syphilis or local injury; no albuminuria or Bright's disease detected; practical speaking there was no cause to account for the aneurysm.

3. Failure of ligature of the superficial femoral at Scarpa's triangle to stop hemorrhage from the sac, and hence
4. The proper treatment in such cases, if diagnosis could be arrived at, and if the patient came early under observation, would be to dissect down on the tumour and tie the main vessel at either side of the sac.
5. The limb below the seat of ligature recovering with the loss of the toes only.

Whether the venous bleeding from the puncture of the popliteal vein assisted in warding off the gangrene is a point worth considering.

6. Variation in the volume of the radial pulse on both the sides, that of the right radial being smaller than the left; the aneurysm being also on the right side.
7. The rise of temperature and delirium were attributed to iodoform poisoning, as the patient seemed to improve as soon as iodoform was discontinued.

Notes on Dysentery.

By Vinayak Sokarji Trilokekar, L. M. & S., Honorary Assistant Physician, J. J. Hospital.

Dysentery is so common an ailment in Bombay, that it will not perhaps be out of place if I give a short description of the prominent features of this disease, as observed by me, in the Jamsetjee Jeejeebhoy Hospital. Having had the advantage of being connected with the J. J. Hospital, and having independent charge of a ward, I had the opportunity of treating many cases of dysentery. I am therefore in a position to give a summary of my own observations on this disease, in the hope that it may be of some use to my professional brethren.

The important points, which I have alluded to in this paper, refer to the sex, age, and race of the patients, the locality and the surroundings amidst which the patients lived, the time of the year when this disease is very common, the principal causes of the ailment, the prominent symptoms observed, the duration of the disease, the pathological changes, and, lastly, the different plans of treatment. All my information regarding the above-named particulars is based upon the Hospital statistics, the *post-mortem* records, and the cases which I personally treated during the last two years and eleven months.

(*a*) *Sex.*—Dysentery seems to be much more common amongst males than in females. Out of the 796 cases that were admitted, 719 were males and 77 were females.

(*b*) *Age.*—As regards the period of life at which dysentery is common, the ailment appears to be most common between the ages of 21 and 40, as will be seen from the following table:—

Age in years.		Number.	
Between	1 and 10	9	
,,	11 ,, 20	70	
,,	21 ,, 30	326	547
,,	31 ,, 40	221	
,,	41 ,, 50	107	
,,	51 ,, 60	54	
,,	61 ,, 70	5	
,,	71 ,, 80	4	
	Total.....	796	

The number of cases between the ages of 21 and 40 is 547, that is, 68·7 per cent. From this table it would also appear that the disease is not common below the age of 10, that is, in children. But this conclusion is not correct, since comparatively few children are admitted as in-patients on account of the reluctance on the part of the parents to keep their children in the Hospital. These cases, however, are treated in the female out-patient dispensary, and the following figures show that the disease is not so uncommon as it would appear from the table given above. The register of the female dispensary shows that 391 children were treated for dysentery, from January 1889 to November 1891.

(*c*) *Race.*—With reference to race, dysentery seems to be much more common amongst the Mahomedans and the low-caste Hindus than in other communities, the disease being not very prevalent amongst the Parsees and the Christians. The subjoined table shows the number of persons belonging to the above-named communities:—

Race.	Number.
Hindus	361
Mahomedans	333
Christians	55
Parsees	39
Jews	8
Total	796

The reason why the disease is more common amongst the Mahomedans and the low-caste Hindus than amongst the Parsees and the Christians is, I think, that the Parsees and the Christians, even the poorest amongst them, are better fed, better housed, and better clothed than the low-caste Hindus and the Mahomedans.

(*d*) *Social position and surroundings.*—The fact that food, clothing, and the social surroundings have a great influence upon many diseases, no one, I think, will deny. Under this heading, therefore, I will allude to the locality, food, and clothing of the patients that were treated in the Hospital.

Firstly.—As regards the locality, a large number of patients came from places that form the unhealthy portions of the town, namely, Bhendy Bazaar with its by-lanes, Nagpada, Dongree, Kamatipoora, Mandvie, Market and Khetwady. These places are unhealthy on account of one or many of the following conditions:—In most of these places the houses are ill-contrived and closely packed, the dwellings are overcrowded, the streets are very narrow, there is want of good light and pure air; there is also want of proper drainage to carry away the excreta and other waste-materials, the result being accumulation of filth and decomposed organic substances (in the streets and lanes), which must necessarily lead to emanations of harmful gases, thus rendering the air impure to breathe; and, lastly, many of the patients living in such localities have rude, careless, and uncleanly habits. The above-named conditions are, I think, the fruitful causes of various disorders. In short, they prepare a soil in which a disease can very easily take its root.

Secondly.—The majority of the patients that were treated were from the poorest classes. Some of them could barely get food enough to live upon. The result of such state is either privation, or, as is generally the case, the supply of food is improper and of bad quality, the latter being one of the commonest causes of gastric and intestinal disorders.

Thirdly.—Most of the patients, with the exception of a few, were badly clothed. Bad clothing leads to exposure to wet and cold, and as such forms the predisposing, and, in some cases, the direct cause of intestinal disorders. The Parsees and Christians are better off in this respect. They are better clothed and better fed than the Mahomedans and the low-caste Hindus.

(*e*) *Time of the year when the disease is common.*—With reference to this point, it appears from the statistics that dysentery is very common in the months of December and January, August and September. It is, I think, within the observation of every one that cold and wet bear an important relation to intestinal and respiratory disorders. Numerous cases of either respiratory or intestinal diseases can be attributed to the patients having exposed themselves to cold or wet. In alluding to the social condition and surroundings of the patients, I have shown that the majority of the Mahomedans and low-caste Hindus are not well-housed or well-clothed. Want of proper clothing and want of proper shelter necessarily lead to exposure to cold during the cold season, which begins in Bombay in the month of December, and to wet in the rainy season or monsoon, which commences in the month of June, rain falling very heavily in the month of August. The reason, therefore, of the disease being so common in the months above-named, is obvious. Very few cases of this disease were admitted in the Hospital in the month of May, which is the hottest part of the year in Bombay.

(*f*) *Causes.*—From what has been said about the social condition of the patients, their surroundings and the time of the year when this disease is common, it is clear that the causes of this disease can be grouped into two classes, namely, the predisposing and immediate or exciting. Under the heading of predisposing causes, the following principal ones may be enumerated :— Bad hygienic conditions, including impure air and improper drainage; want of proper clothing; bad food meaning necessarily bad state of health; and, lastly, in a very few cases the predisposing cause was long and continued living

in malarious places. As regards the direct causes, the most common was exposure to cold and wet. Errors in diet formed another group. In a few cases of continued fevers it was observed that dysentery followed the febrile attack as a sequel; and, lastly, in a very few cases patients were found suffering from ague and dysentery at the same time.

(*g*) *Symptoms.*—It is hardly necessary to dilate on this point, as the symptoms were almost identical with those described in various treatises in medicine. Pyrexia—the temperature in acute cases usually varied from 100° F. to 103° F.; tenesmus and tormina were always present; the tongue dry-coated and parched in bad cases. In grave and fatal cases the symptom constantly present was persistent hiccough.

(*h*) *Course and duration.*—On an average in acute cases the attack lasted usually from three days to a week or two weeks. In fatal cases death usually took place from the third to the ninth day, hiccough, as said before, being almost always present. The chronic form, however, seems to be very obstinate, lasting for a variable time, sometimes for months, and in a few cases extending over a year or more.

(*i*) *Mortality and recovery.*—The death-rate in cases of dysentery was 20·3 per cent. In the chronic form it was higher than in the acute variety. In acute cases death usually resulted from collapse or with typhoid symptoms. In the chronic form death took place from gradual exhaustion and emaciation. Regarding recovery, it followed in the majority of cases of acute dysentery, while in the chronic form recovery was not so marked. Out of the 796 cases, 367 were discharged cured, 267 were discharged relieved, and 162 died.

(*k*) *Post-mortem appearances.*—The pathological changes seen in the intestinal tract in cases of acute dysentery were almost always confined to the large bowel; in exceptional cases only the changes extended into the small intestines. The appearances seen in cases of acute dysentery varied from deep congestion and vascularization of the solitary glands to the formation of ulcers in the large bowel, particularly at the upper part of the rectum and the sigmoid colon. The ulcers,

in a few cases, were small and regular; but in the majority of cases they were large and irregular in outline, having usually a transverse direction. The mode in which the ulcer is formed is, I think, as follows:—The first thing noticed is a reddish elevation due to the congestion and vascularization of a solitary follicle. This after a time softens and breaks in the centre, leaving an ulcer with overhanging edges. The ulcers generally extended to the mucous and submucous coats only, the muscular coat being not affected by the inflammatory changes. In two cases of dysentery, there was perforation of the intestine which resulted in purulent peritonitis and death. In some cases the ulcers were covered with black sloughs, the contents of the bowels having an extremely offensive odour. In chronic dysentery, on the other hand, the intestines presented a different appearance. The ulcers were generally irregular in outline having indurated edges, the intestinal coats were also considerably thickened and indurated; the appearance of the intestine too was changed, the colour of the lining membrane being dirty grey. In one case, the large intestine was covered all over with large, irregular and sloughing ulcers. The other abdominal viscera were in most cases healthy. In about three or four cases, the liver contained small and scattered abscesses in its substance. With reference to the relation which the liver bears to the intestinal tract in cases of dysentery, I might here mention that in a good many cases of hepatic abscess, the patients give a history of a previous attack of dysentery. As already mentioned there was purulent peritonitis in two cases. The other viscera were generally found healthy, except that in some cases there were evidences of hypostatic pneumonia.

Treatment.—The most important thing to attend to, is to confine the patient to bed and to provide him with warm clothing. Before commencing any especial treatment it is better to give to the patient about four drachms of castor oil with 15 drops of tincture of opium. This has usually a beneficial effect on the future course of the disease. Regarding the relative merits of the different drugs and their usefulness in his ailment, I would here mention that no hard and fast rules

can be laid down. What will succeed in one case, may not succeed in another. I will, therefore, relate those plans of treatment that were found useful in a large number of cases, with their comparative usefulness in checking the progress of the disease. In acute dysentery the drug that was most useful was Ipecacuanha. In fact, it can almost be called a specific. The mode in which the drug is best given is as follows :—The patient is to take nothing whatever for at least 2 hours before the administration of the drug. Half an hour before the drug is administered, the patient is to be given about 25 minims of Liquor Morph. Hydrochlor. in half an ounce of Chloroform water. This is followed by 25 to 30 grains of Ipecacuanha powder mixed with four drachms of syrup of ginger or any other suitable vehicle. The patient after taking the drug is to lie perfectly quiet in bed for 3 hours, nothing being given to him during this time. This should be repeated again in the evening. To prevent the vomiting which this drug frequently sets up, it is always good to keep a mustard poultice over the epigastrium. The patient, between the intervals of administration of this drug, is to be nourished with milk and conjee. This plan of treatment requires repetition on the second and sometimes on the third day. By the third day, in the majority of cases, the severity of symptoms subsided, stools lost their dysenteric character and became more feculent, and the general condition of the patient improved. For about two or three days after the improvement is noticed, it is always advisable to give Ipecacuanha and opium pills, containing ½ grain of opium and 1 grain of Ipecacuanha. This plan of treatment answered best in the majority of cases of acute dysentery. When it was impossible to give Ipecacuanha by the mouth, owing to the intolerance of the stomach to this drug, I have seen beneficial results following upon the administration of the drug in the form of an enema containing two drachms of Ipecacuanha wine, one of tincture of opium, and half a pint of warm conjee water. The local treatment was of great value. Griping is best relieved by the application of

warmth to the abdomen, turpentine fomentations and mustard poultices. In milder cases the Hospital bismuth and morphia mixture or powders containing bismuth, bicarbonate of soda, and Ipecacuanha or Dover's powder answered the purpose well.

Since writing this paper, I read Dr. Leahy's articles in the *Lancet* on the value of a saturated solution of Epsom salts in cases of acute dysentery. I have not been able to give a fair trial to this plan of treatment owing to the patients not coming to the hospital at the onset of the disease. In a few cases where the symptoms were not very acute, I tried the plan recommended by Dr. Leahy, but without any good results. I, however, cannot say anything definite as to the value of Dr. Leahy's treatment before giving a fair trial to it, which I intend doing shortly, hoping to give the results of my observations in another article.

Diet in cases of acute dysentery requires the most careful attention. The best diet is milk diet. The J. J. Hospital milk diet with the addition of small quantities of soup or extract of meat answered the purpose quite well in many cases.

J. J. Hospital Milk Diet.

Carbon—2988·43 Grains.	Nitrogen—175·06 Grains.
Breakfast	2 ozs. rolong, 10 ozs. of milk, and ½ oz. sugar to make conjee.
Dinner	6 ozs. rice, 10 ozs. of milk, and ¼ oz. sugar to make conjee.
Supper	2 ozs. rolong, 10 ozs. of milk, and ½ oz. sugar to make conjee.

Thirst can be relieved by giving small pieces of ice to suck. In a large number of cases stimulants were not needed; and if possible they should be avoided; but when adynamic symptoms set in it is necessary to give stimulants. Hiccough when present is best treated by a hypodermic injection of $\frac{1}{6}$ gr. of morphia over the pit of the stomach. It is hardly necessary for me to point out the importance of hygienic measures. During convalescence attention should be paid to diet and clothing.

It is always good to give a mild preparation of iron combined with bitters during the state of convalescence.

The treatment of chronic dysentery is not very satisfactory. Numerous plans of treatment have been advocated by different medical men, but they have not proved universally useful. I have seen the best results from the administration of bichloride of mercury and tincture of Indian hemp. The following is the best mode of giving this drug:—

R.

Liquoris Hydrargyri Perchloridi,	ʒi.
Tincturæ Cannabis Indicæ,	ʒi.
Mucilaginis Acaciæ,	ʒiv.
Aq. Chloroformi ad	℥vj

One-fourth part four times a day.

Occasional doses of castor oil are also useful. In some cases I have found good results from the following pills:—

R.

Cupri Sulphatis,	gr. i.
Extracti Cannabis Indicæ,	gr. i.
Quininæ Sulphatis,	gr. vi.
Extracti Gentianæ,	q. s.

Make four pills. One pill four times a day.

Or

R.

Hydrargyri Subchloridi,	grs. iv.
Pulveris Ipecacuanhæ,	grs. viii.
Pulveris opii,	grs. ii.
Extracti Gentianæ,	q. s.

Make four pills. One pill four times a day.

Quinine, of course, is necessary in dysentery due to malarious influence; while bael extract is useful where there is a scorbutic taint. Enemas of permanganate of potash or nitrate of silver answer well in some cases of chronic dysentery. Regulation of diet is very important. Local applications already mentioned prove useful, and lastly the patients should always wear warm clothing, should avoid exposure, and should pay strict attention to cleanliness and other hygienic measures.

A Year's Surgery in the J. J. Hospital: with Notes.

By Brigade-Surgeon W. Gray, Principal and Professor of Surgery, Grant Medical College, and Senior Surgeon, J. J. Hospital.

In the Introductory address which forms the first paper of this number I have given a sketch of the Progress of Surgery in Bombay during recent years, and have also described generally the methods we pursue here in the antiseptic treatment of operation and other wounds. I will now proceed to supplement this by an account of a year's practice in the surgical wards and out-patient department of the J. J. Hospital, and will take the records of the year just ended to illustrate the nature and results of the surgical work that is usually accomplished in a large native hospital on this side of India.

Of 7,276 in-patients treated during 1891, from 35 to 40 per cent. may be classed as surgical. A slightly larger proportion of the out-patients, of whom 46,537 were treated, may be placed in the same category. Amongst the principal injuries and surgical diseases of in-patients were 651 cases of venereal disease, including complications. Of non-malignant new growths there were 38 cases; of malignant new growths, 73; tetanus, 48; inguinal hernia, 35—4 reducible and 31 strangulated; diseases of the rectum and anus, 88 cases; hepatic abscess, 44; vesical calculus, 55; diseases of the male urinary and genital organs, exclusive of calculus and acute venereal disorders, 187; bone and joint diseases, 111; large abscesses, 162; ulcers, 166; general injuries, including burns and scalds, 66; injuries

of the head and neck, 98; injuries of the chest, 24; injuries of the back, 15; injuries of the abdomen, pelvis, and genital organs, 11; injuries of the upper extremity, 117; and injuries of the lower extremity, 138. Out-patients, including those who required hospital treatment but refused to remain, furnished 3,974 cases of venereal disease including complications; of small non-malignant new growths, 153 cases; malignant new growths, 23; tetanus, 20; diseases of the ear and nose, 1,380; diseases of the teeth and gums, 1,613; affections of the mouth and fauces, 171; reducible inguinal hernia, 247; diseases of the rectum and anus, 221; diseases of the male urinary and genital organs exclusive of acute venereal cases, 1,014; bone and joint affections, 117; abscess, 1,667; ulcer, 878; burns and scalds, 262; injuries of the head, neck, and trunk, 2,903; and of injuries of the extremities, 4,319 cases. Besides the diseases and injuries of out-patients here enumerated there was a large attendance of other surgical cases of less consequence. I now pass on to discuss shortly, under the more important headings, the results of our surgical work during the year 1891.

Venereal Diseases.—As regards this class of diseases there are two circumstances connected with the practice of the J. J. Hospital which deserve particular notice. It must be remembered that the C. D. Act, which had previously been in force in the city of Bombay, was suspended on 1st July 1888. At this date the Act was working smoothly, and a considerable number of women were being periodically examined; while those found to be diseased were admitted for treatment to the Lock Hospital. The accompanying table will show, better than words, what we who work amongst the poorer classes of native sick not unreasonably think were the effects of its action and of its suspension. The table deals with the returns of the J. J. Hospital for the last twelve years, and I have chosen 1880

to commence with, since it was in that year that the first serious attempt to administer the Act was made :—

Year.	Total of venereal diseases, for both in and out-patients.	Syphilis only, for in and out-patients.	Syphilis for in-patients only.	Remarks.
1880 ...	3,680	2,307	391	
1881 ...	2,584	1,802	374	
1882 ...	2,861	1,940	425	
1883 ...	2,720	1,902	469	
1884 ...	3,058	2,080	475	
1885 ...	2,426	1,266	419	
1886 ...	2,233	958	276	C. D. Act repealed in England.
1887 ...	1,972	1,273	274	
1888 ...	1,734	1,073	177	Bombay C. D. Act suspended July 1st.
1889 ...	2,588	1,780	356	
1890 ...	3,740	2,162	498	
1891 ...	4,625	2,892	525	

In order to avoid mistakes or misapprehension I have given the statistics under three heads. To the first two exception might be taken, on the ground that the number of admissions amongst out-patients do not represent so many distinct cases —that in many instances the same person might, and probably would, be counted as more than one admission. I have, therefore, by way of preventing any error of this kind, given also the statistics under the third head, and these, as a matter of fact, represent not only so many admissions, but so many distinct persons as well. However they are taken the figures tell the same tale—a progressive decrease of venereal disease during the efficient administration of the Act, and a progressive

increase since its abolition. They speak so eloquently as to need no further comment. The second circumstance I have alluded to, speaks the same language, and with equal clearness. There can now be no doubt that, for the last three years, the type of syphilis, as seen in the J. J. Hospital, has altered ; and the alteration has taken the form of an increase in the severity of the disease. Fifteen or twenty years ago the phagedænic chancre, and the sloughing phagedæna, were both of common occurrence here. For some years previous to 1888 they had practically disappeared. Students had gone through their course of clinical instruction in surgery without ever having seen a case of either form of disease. As a significant commentary on the figures in the table it is sufficient to mention that during the last three years these severer manifestations of venereal disease have reappeared, and many cases have been admitted to hospital. As regards the various forms of secondary syphilis, the unusually large number of severe cases seen in the course of last year is matter of common observation amongst the Hospital Staff. The pustular syphilides, iritis, obstinate condylomata of the face and neck, necrosis, and destructive ulceration are far more common of late, and are, in my opinion, becoming less amenable to treatment.

New Growths.—Of the *non-malignant* tumours none were of any very great interest or importance. A considerable proportion of them were small fibromata of the external ear, small sebaceous cysts of the scalp and face, and glandular enlargements. Of elephantiasis of the scrotum and prepuce there were 24 cases, but none of them were remarkable for size. The largest weighed about fifteen pounds. One case of molluscum fibrosum was admitted for operation in whom the growth sprung from the whole circumference of the lower part of the trunk, and hung around it in folds like a flounce. A number of small tumours were present on other parts of the body, both trunk and limbs. This case had been in hospital on two former occasions, when a large portion of the new tissue was excised, but when he appeared for the third time the growth had recurred, and was worse and more inconvenient

than before. The patient presented the usual stunted and ill-developed aspect so characteristic of this disease. Though a man of 28 his height was only 4 feet 10 inches. We have frequently noticed this affection as being hereditary, and as existing in more than one member of a family. A second stunted specimen also came for treatment—an old man covered with some hundreds of tumours of varying sizes. Both ears and nose were blocked up by growths. The small, hard fibromata of the ear are very common amongst native women who wear earrings. They range from the size of a pea to that of a walnut, are usually symmetrical and spring from the margin of the ring hole. They are occasionally liable to recur. The *malignant* growths were nearly all epitheliomata and sarcomata; most of them coming to hospital with the disease too far advanced to admit of operation. The first named were situated chiefly on the face, larynx, tongue, cheek and lips, labia, penis and anus. Epithelioma of the lip occurs here usually on the upper lip or at the corner of the mouth, and oftenest in women. In one case the disease, which involved the cheek, was melanotic. In two instances the destructive ulceration had laid open the antrum, mouth, and nasal passages. This process of destruction is not infrequently aided by the caustic applications prescribed by quacks. Most of the sarcomata observed were of the soft rapidly growing varieties; and their favourite seats were the side of the neck and the forearm. Within three months five cases were seen where the growth sprung from the lower extremity of either radius or ulna, and in no instance would the patient submit to the necessary operation. Scirrhus of the breast occurred five times, one of the cases being and old man. There were three cases of adeno-sarcoma of the breast. In one of these the mass of rapid growth weighed seven pounds, and the patient left hospital, apparently well. Scirrhus in this situation, or indeed elsewhere, is comparatively rare in our hospital practice. Soft sarcoma and epithelial cancer constitute nearly the whole of our admissions for malignant disease: and last year is no exception to the rule.

Tetanus.—It may now be alleged with truth that tetanus, as a disease originating in the hospital, has ceased to exist. The gradual disappearance from our hospital of this bane of Indian surgery is coincident with the progressive improvements in antiseptic modes of treatment, and with the replacement, by tiles, of the primitive earthen floors of the wards. This circumstance is, to my mind, one of the most convincing proofs of the essentially contagious nature of tetanus. Years ago, long before the specific bacillus was even thought of, our experience here brought us to the conclusion that tetanus was contagious. We could explain in no other way such facts as the disease hanging around one particular part of a ward, or one or two beds; or the case of injury with open wound, in the bed next to one of tetanus, being attacked later with the same disease. Even without the discovery of the bacillus our experience of the effects of antiseptic methods, and of improved sanitation, would have been amply sufficient to lead us to a correct inference as to the infective nature of the scourge, and the modes by which its propagation was encouraged. I long since arrived at the conclusion that wound insanitation was the main factor in the evil, aided, as I also suspected, by certain defects of hospital construction, notably the earthen floors. It is even now no uncommon occurrence for patients suffering from injury to leave the hospital before their wounds are healed, and to die shortly afterwards, at their own homes, from tetanus; the undoubted result of uncleanliness. Looking backwards, the time does not seem so very distant when we were, more than once, obliged to suspend operative surgery, except in urgent cases, in consequence of an outbreak of tetanus in the surgical wards. Nothing was so disheartening to a surgeon as to find his best operation cases, when just approaching recovery, suddenly attacked by tetanus and carried off in a few days. Now, all this is changed, we have seen no case during the past year that has not been admitted from outside with the disease already established. Not a single instance has originated within the hospital. The type seems somewhat less fatal than formerly. The mortality is now about 60 per cent., whereas in some of the more

virulent hospital outbreaks alluded to it was as high as 88 per cent. The predisposing causes are very various. Any breach of surface, no matter where, or how, render the patient equally liable. I have never been able to perceive that the tendency or susceptibility to tetanus is in the least influenced by the kind of injury, or by its situation or extent. I have seen it follow ulcerated scirrhus, guinea-worm frequently, syphilitic ulcer, every kind and size of operation or accidental wound from the largest to the most minute, burns and scalds; also, many times, parturition or abortion. Puerperal tetanus is invariably fatal. Tetanus is very common amongst horses in this country after operation of any sort, but we have never been able to discover distinct proof of connexion between the prevalence of equine tetanus and the disease in man. As a rule, the patients we receive are people totally unassociated with horses. It is more probable that the affection in both has a common origin, and that any attempt to explain its occurrence in man by communication from the horse is unnecessary. The duration of the hospital cases varies considerably; some dying within three days, others lasting for a fortnight, and one or two as long as three weeks. Should they survive the latter period recovery usually takes place. The mode of death in the more severe and rapid cases was sometimes asphyxia, and in others by speedy exhaustion, almost collapse. In the protracted cases death was always the result of gradual exhaustion, due to muscular spasm and inability to swallow. Our treatment consists of sedatives, usually chloral and bromide of potassium, easily digested nutriment, alcohol if necessary, and antiseptic treatment of the predisposing injury. The chloral subdues spasm, lessens irritability, obtains sleep, and in this way conserves the strength generally. If it does not cure, we think that, at least, the duration of the cases is prolonged by its use, and a better chance of recovery thus afforded. Many of the patients who are brought to hospital are, however, past treatment, and die in a few hours. We have not yet attempted any experiments as regards the newly-suggested specific modes of treatment.

Hernia.—Reducible inguinal hernia is comparatively common in Bombay amongst all classes, and is not infrequently associated with hydrocele. Most of the cases that attend the hospital come to be supplied with trusses. Occasionally we meet with a tumour of enormous size, containing nearly the whole of the small intestines. Of strangulated hernia 31 cases were admitted. In 16 the protrusion was returned by taxis, and the patient relieved, and in 15 herniotomy was performed. If the descent of the intestine is very recent, or if the case partakes more of obstruction than strangulation, the treatment is an ice-bag over the swelling, and occasionally a dose of opium. In many instances the hernia slips back of itself under this simple treatment; in others slight pressure completes the process. If after a reasonable time, no benefit results, the patient is chloroformed, gentle taxis again applied, and if this fails—herniotomy. In certain cases, when symptoms are very urgent, or when much time has elapsed, or if the patient has been treated outside, herniotomy is performed at once without any preliminary treatment. Only one case of femoral hernia (reducible) has been admitted during the year. It is one of our rarest experiences in any year. We have never yet observed it here in a female, and within recent times I am aware of only three cases in males; two of which were reducible, and the third strangulated. Umbilical hernia, although very common among native children as a temporary condition, is conspicuous by its absence in adults. It may be mentioned here that we have met with two cases of strangulated ventral hernia in male adults during the last few years. In each case the protrusion made its way through a congenital opening in the left *linea semilunaris*, in its upper third. Herniotomy was performed, and both patients recovered, with radical cure in each case.

Diseases of the Rectum and Anus.—There has been nothing out of the common in our experience of this class of diseases during the year just ended. The cases are mostly hemorrhoids, ischio-rectal abscess and fistula, and occasionally obstinate rectal ulcer, as a consequence of dysentery or syphilis. There were

also one or two cases of syphilitic stricture. Piles, in refractory cases, are usually removed by clamp and cautery, with good results. Of late, however, we have tried, with complete success, the entire excision of the pile-bearing section of the rectal mucous membrane, recovery in all cases being rapid, and apparently permanent. The treatment of fistula is, to some extent, unsatisfactory, as patients will not submit to the restraint and loss of time necessary to secure a favourable result. They, as a rule, insist on leaving hospital just at the period when most care is required to prevent the fistula from re-forming. Many of the cases, too, seek admission with the disease far advanced, and practically beyond treatment: fistulæ have burrowed far and wide and extend deep into the pelvis.

Hepatic abscess.—We are now accustomed to regard this affection as belonging to the surgical department. Its treatment is almost entirely by surgical methods. Forty-four cases were admitted as in-patients during the year. Of these, 29 were treated by incision, most of the others being past treatment. In some of the cases aspiration preceded incision; but more with the object of relieving tension and pain than for any other reason. Of the 29 cases incised, 17 were cured and 12 died. We have the somewhat unusual experience of two cases occurring in children in the course of the last couple of years, both of them ending fatally. Our knowledge of the causes of hepatic abscess, and of its rational treatment is still, as it seems to me, eminently unsatisfactory. There is little doubt that dysentery is at the bottom of one form of the disease, and that another is due chiefly to the abuse of alcohol; but in the greater number of the cases that come to us no history of either kind exists. To what, then, are we to attribute the hepatitis? Sometimes, perhaps, to chill. It is all very well to talk of "malaria" as a cause; but "malaria" in this connexion, and indeed in many others, is, to my mind, only another word for ignorance. When we say that a local disease, like hepatic abscess, is caused by "malaria," it amounts to saying that we know little or nothing about the matter. In fact, our

knowledge of the influence which is called "malaria" is so infinitesimal that we have as yet no right to assert that it has even any definite existence. A very large number of people here suffer from dysentery, from "malarious" fevers, chill, and abuse of alcohol; and if all these were active causes we ought naturally to meet with a far larger proportion of hepatic abscess cases than we do. There must be some other cause concerned, on which we are as yet uninformed. Can ingestion of the biting and irritant red pepper, and other pungent spices, which enter so largely into native dietaries, have anything to do with it; or be at least a predisposing cause? The point is worth inquiry. Our treatment consists of free incision,—often two openings—free drainage, cleanliness, and general support. Here, too, the element of uncertainty is characteristic of the disease. The case which looks most unpromising at first is quite as likely to recover as the one that seems to have everything in its favour. The reverse condition of things also holds good. It is in most instances difficult to say at the beginning what course the disease will probably take. Experience teaches us this much, however, that the abscess of dysentery always does badly, and that a very chronic abscess pointing in front, or a small abscess behind, usually do well: also, that phagedænic action attacking the margins of the incision or opening is invariably a fatal sign. Nothing is, apparently, of the least avail to limit its progress. I am inclined to believe that syphilitic infection is somehow concerned with this strange complication of liver abscess.

Vesical calculus.—Fifty-one cases of this affection were treated in the J. J. Hospital during the past year, both by cutting and crushing. Out of the whole number two died. At least half the patients were children under twelve, the rest adults from eighteen to sixty. There were also nine cases of impacted urethral calculus treated amongst out-patients. Few of the cases admitted came from Bombay itself, or indeed from anywhere in the Konkan, except one locality in the Ratnagiri Collectorate, namely, Chiploon. Nearly every year we have one or more cases from this place. The parts of the country

which supply most of our stone patients are the Deccan, Guzerat and Kathiawar; a few also come to us from Kutch. The opening of the fair season in October always brings them from these districts, to Bombay, with a rush. For some years past there has been a progressive increase in the numbers admitted to the J. J. Hospital, and this we not unnaturally attribute to our very small mortality, as well as to the circumstance that lithotrity is more and more practised here. It is not so uncommon a thing for a new patient to tell us that he has been advised by a friend or relative to come to Bombay for treatment, because there he will possibly be relieved without "cutting." One successful case brings us others for operation. As regards the source and origin of calculus, a long study of our statistics, and of individuals, convinces me that climate alone is primarily responsible. Heredity, as a secondary cause, and springing out of the first, has to do with it also to some extent. Stone has been, and is, attributed by various authorities to diet, water, soil, and, in India, to that ever-convenient refuge of our ignorance—"malaria." In this Presidency we find the affection common to districts with varying soils, diets, and waters; and, as far as "malaria" is concerned, the one thing that stands out prominently is the fact that, in Western India at least, the districts in which stone is rarest, we might well say non-existent, are precisely those where "malarious" affections are most prevalent. A careful examination of the Surgeon-General's statistics, and of our own Hospital records, makes it clear beyond all doubt that the frequency of stone is in inverse proportion to the amount of rainfall. In other words, the drier the climate the greater is the prevalence of stone; and this prevalence is altogether irrespective of any other condition that I can discover. A rainfall map and a stone map of Western India and Sind would all but correspond were the lighter shadings used to indicate the occurrence and comparative frequency of the disorder. The bearings of these facts, looked at in connection with the intimate associations that exist between the hygrometric state of the atmosphere and the relative amounts of cutaneous exhalation and urinary

excretion, are obvious, and fit in accurately with what Dr. Vandyke Carter's researches have taught us regarding the formation of an acid calculus. The phosphatic calculus is of course quite a different matter, and its presence is easily explained on grounds that are perfectly well known.

Diseases of the Urinary and Genital Organs.—Excluding those cases which are immediately associated with acute venereal conditions, 1,200 of this class of disease have been treated in the course of the year. *Retention of urine* accounts for 192 cases. Some of these suffered from stricture, but a large number were old men of feeble micturating powers. It may be remarked here that whenever cold weather sets in suddenly in Bombay a rush of these retention cases to hospital, for relief, invariably follows. Hypertrophy of the prostate, as a cause of retention, has been noted in two cases only. Amongst the classes who form our Hospital population this affection is decidedly uncommon; but somewhat less so, however, in people belonging to the classes who live in better circumstances. In all the cases that have come under my observation, the affection appeared about the age of 50, and in one or two even earlier. Of *organic stricture,* the consequence of gonorrhœa, 160 cases were treated, with varying results. The treatment pursued was usually gradual dilatation with steel sounds: and sometimes continuous dilatation, by allowing a small soft catheter to remain in the urethra for a week, was employed with success. In five cases of very tight and obstinate stricture, external urethrotomy gave good and encouraging results, and is a mode of treatment likely to grow in favour. It has been too long neglected. A few cases of retention in which it was found impossible, after a reasonable effort, to introduce a catheter were relieved by aspiration above the pubes. This procedure, though not infrequently resorted to here, has always been most successful: there has been no local damage, and, after a few days' rest to the urethra, an instrument easily passes, and the usual treatment can then be undertaken. Cases of *extravasation of urine,* the result of old stricture, are occasionally brought to hospital as a rule in a very

low or dying state. Three were admitted during the year, of whom two died. It is worthy of note, in connexion with the increase of venereal disease since the suspension of the Act, that the admissions for organic stricture have undergone a corresponding progressive increase. In 1887 they numbered 46: in 1891 they were 160. Abscess and sloughing of the scrotum is not infrequent in our Hospital experience. Several cases occurred last year, most of them old, debilitated, or scorbutic subjects. Good food and stimulants usually bring about rapid recovery. Of *hydrocele* of the tunica vaginalis, the large number of 447 were treated: occasionally five or six in one morning. After many experiments of various kinds, we are now satisfied that the iodine injection treatment can hardly be improved upon. It rarely fails to effect a cure at the first trial, and a second is sure to succeed. The sole objection is, or rather was, the severe but transient pain at the time of injection, and this we find can be easily overcome by the addition of a small quantity of carbolic acid to the solution. Now and then a patient declines injection, preferring repeated visits to hospital for simple aspiration. None of the cases seen presented any remarkable peculiarities. A few were of considerable size. The fluid was in all of the usual kind. It may be worth mentioning that about four years ago a case occurred in which the fluid removed from the tunica was milky, and swarmed with filariæ. Careful investigation failed to throw any light on the origin of the case, and, as he declined to remain in hospital, was lost sight of. As regards the pathology of chronic hydrocele, long enquiry and observation lead me to the belief that excessive functional excitement of the testes has much to do with it. The male sexual powers are put in operation at a very early age in this country, and are overworked, not only in youth and middle age, but to a comparatively late period of life. Space will not here permit me to enter into the facts and observations on which this theory is based. I content myself by saying, for the present, that they are numerous and important enough to afford a sufficient and reasonable foundation for it. Gonorrhœa also may possibly

account for a good many cases. As usual, when we are ignorant, or in doubt, as regards causes of disease in this country, the "malaria" myth is dragged forth and made to serve as a satisfactory explanation of every difficulty: and hydrocele is no exception to the rule. Each year we admit several cases of *acute hydrocele* of the tunica vaginalis, the history of which is generally a rigor, followed by fever, with pain and rapid enlargement of the scrotum. In a few days the tunica is filled with turbid serum and is thickly coated with exudation. A free incision, with drainage, gives relief at once and the cavity speedily closes and heals. I have not as yet been able to assign definite reasons for many of the cases, where the severe inflammatory symptoms have come on without apparent cause. In a few instances a chronic hydrocele preceded the acute form; and this had sustained injury in some way; usually an attempt by a quack to evacuate the fluid through a puncture made by an Acacia thorn, or by a porcupine's quill. The latter is the recognised quack's instrument for the purpose. In most of the cases, however, no other history could be obtained than that the affection "came on of itself." All the patients were noted as being anæmic and in feeble general health. Eleven cases of *hæmatocele* were treated, chiefly by castration. Patients seek aid at so late a stage that no other treatment is admissible. *Varicocele* is very rare, only two cases having been seen during the past year. Of gonorrhœal *epididymitis* and *orchitis*, there were 145 cases, none of them being of any particular interest, or of any great severity.

Diseases of Bones and Joints.—These furnished 306 cases. Necrosis, caries, and suppurative arthritis account for a considerable proportion: acute and chronic synovitis and fibrous ankylosis for most of the remainder. Scrofulous caries of the carpus and tarsus is a very common affection, and nine-tenths of the cases occur in young Mahomedan females. I have noticed the same circumstance in private practice also. Few of the patients come to hospital for treatment until the resources of the hakim and bone-setter have been exhausted;

and then too late for any attempt at conservative surgery. Amputation is generally the sole alternative left us. Many of these cases suffer from advanced phthisis in addition to their other ailments. The prevalence of scrofulous caries, including that of the vertebræ, amongst Mahomedan women may, I think, be attributed mainly to the secluded sedentary life they are compelled by custom to lead, and this in dark, foul, ill-ventilated, and over-crowded dwellings. Destructive arthritis of the knee and elbow, the latter more especially, is also not uncommon in this class of the community, and treatment, for the reasons just mentioned, is quite as unsatisfactory as in the case of the hand and foot. Hip-joint arthritis is a disease seldem seen here ; why, it is not easy to say.

Abscess is very frequent amongst the poorer and ill-fed classes. An average of six or seven cases daily have been operated on during the past year. Many of these were small children, in whom the abscess is usually seated about the head, neck, and upper extremity. Scurvy, starvation, and scrofula seem to be the chief causes. Large burrowing abscess of the thigh and gluteal region are common in debilitated adults. The local treatment is free incision, free drainage, and cleanliness. They mostly do well, but sometimes recovery is slow. As in so many other surgical affections patients come late for treatment, when the matter has burrowed far and wide, and the costitution is thoroughly undermined. We have also admitted four cases of *perityphlitis*. These were treated in the manner just described, and all recovered ; as such cases usually do when taken in hand easily. *Carbuncle* in hospital patients is comparatively rare ; we saw but nine cases last year. Amongst well-to-do private patients, however, the affection is common, and is nearly always associated with diabetes. The latter malady, it may be remarked, is hardly ever seen in our hospital. Not a single case was treated during the year just ended. Of *pyæmia* we have had three cases of the chronic variety, all brought from outside, and all recovering. The numerous cases of acute *ulcer* of the lower extremities were chiefly due to slight injuries in starved and scorbutic subjects.

In a few there was rapid and extensive destruction of tissue, but all, under the influence of good food, rest, tonics, and cleanliness did well. Several chronic ulcers of the leg and foot were also treated, either by incision or by firm continuous pressure with a piece of sheet-lead. Both modes give good results in suitable cases, and may be used separately or combined. A few patients with senile gangrene of the foot were admitted, and, whenever consent could be obtained, life was saved, or prolonged, by amputation at the knee.

Injuries.—The effects of heat were of the usual kind, and occurred most often in women and children. The upsetting of mineral oil lamps, or the clothes catching fire in other ways, were the principal causes of *burn*, in which division the greater number of heat injuries are included. *Scalds* have been at all times comparatively uncommon in Bombay ; when they do occur they are generally due to steam from boiler explosions. Of 33 severe cases of burn admitted eleven died. The treatment we now employ, fixed upon after many experiments, consists of antiseptic applications, and a thick coating of oxide of zinc paint made up with boiled linseed oil and turpentine. This gives good results in suitable cases where the injury is not too severe and the patient is seen early. When the injury extends beyond a certain limit, it is hardly necessary to say that no treatment is of much avail ; these severer cases rarely survive more than two days. *Multiple injury* due to accidents from explosions, falling houses, in factories, quarries, and on the railways, caused eighteen admissions, with twelve deaths. Most of the latter resulted from visceral injury added to factures and external wounds. *Fractures of the skull* accounted for 22 cases, including 14 of the base. Three of the latter recovered. None of the cases were characterised by anything extraordinary. The treatment of these injuries consists mainly of ice to the head, antiseptics also if the fracture is compound, saline purgatives, low diet, and operative interference whenever considered necessary. Inflammatory complications are the exception, and death when it occurs is always the direct consequence of the injury. One interesting case of contusion of the

brain, resulting fatally, was admitted. A young man was struck on the left parietal region with a thin heavy stick, the scalp being divided down to the bone. He was unconscious when brought to hospital, and died shortly after. No fracture could be discovered, on the most careful search, either during life or at the *post-mortem* examination. On the surface of the cerebrum, however, and exactly corresponding in size and position to the external injury, there was a well-marked contusion which damaged the brain substance to a depth of at least one-eighth of an inch. From this a considerable quantity of blood had escaped, and had collected below as far as the base of the brain. The skull was slightly thinner than the average. There were 39 cases of *fractured ribs,* most of them due to street accidents and assaults. In two instances from the streets, an old woman and a child, the side of the chest was actually stove in and the lung lacerated ; yet both recovered rapidly and without a bad symptom. But one fatal case was recorded under this heading—that of a middle-aged man who was struck full, close to the left nipple, by the end of the shaft of a dog-cart. There was no mark of external violence perceptible: the skin was apparently not damaged, but two of the costal cartilages were fractured and driven backwards, and the right ventricle was ruptured. The man lived for an hour after this injury. *Fracture of the spine* caused four admissions, one of whom recovered. *Abdominal injuries* are now become rare, for some obscure reason. Formerly they were very common here and took the form of homicidal penetrating stabs, with or without wound of contents; and of visceral rupture from railway and machinery crushes. During the last year we had but one instance of each: the stabbing case, in which the edge of the liver was notched by the knife, recovered, and the case of ruptured liver, from a fall, died. There were three admissions for rupture of the bladder and two for fracture of the pelvis. None of the former would submit to operation, and all died ; as did also one of the latter, from shock. The principal *fractures of the upper extremity* included 3 of the scapula, 19 of the clavicle, 61 of the humerus, 124 of both bones

of the forearm, 10 of the radius, 6 of the ulna, and 231 of the fingers. Of *dislocations* there were 4 of the outer end of the clavicle, 25 of the humerus, 3 of both bones of the forearm backwards, 2 of the wrist, and 6 of the fingers. In the *lower extremity, fractures* of the femur account for 55 admissions: there were 40 of both bones of the leg, 11 of the tibia, 4 of fibula, 3 of the patella, and 5 of the bones of the foot. The *dislocations* were 4 of the hip, and one each at the knee and ankle. Of all the above there were seven important compound fractures in the upper extremity, with one death after operation; and in the lower extremity thirteen of the fractures, one of the thigh and twelve of the leg, were compound: the first died after operation from shock and general injuries, and one of the latter cases perished from gangrene. With the exceptions noted all the cases did well. Rapid union was the rule, while careful antiseptic measures in the compound fractures prevented inflammatory complications, and converted them practically into simple fractures. This was well exemplified in a boy of 12 who had sustained a tramcar crush of the leg, with comminution of the bones and much damage to the soft parts. The attempt to save the limb here was entirely successful, and he has not suffered the smallest disability. One of the dislocations was complete displacement of the tibia backwards, from the kick of a bullock just below the knee. This is the first instance, on our records, of such an accident. *Wounds* of soft parts were very various as regards cause, situation, and severity. The cotton mills, other factories, and the streets especially, as also assaults and drunken disturbances are responsible for the greater number. As a rule, wounds healed easily and without complication. In all the seven cases antiseptic dressings were employed, with highly successful results. The much debated question, as to whether wounds heal more readily in Europeans or in Natives, is still occasionally raised; and I have from time to time made observations with the view of helping to decide the point one way or other. In perfectly healthy selected subjects of both races, treated in the same way, under the best sanitary circumstances and

surroundings, I have never been able to perceive any difference in the rate or course of wound healing. Even in subjects that are not altogether healthy, antiseptics have done away with inflammatory complications and, to all intents and purposes, have brought the healing process up to the health standard. Here again there is no difference perceptible as between European and Native. With respect, however, to wounds treated without rigid antiseptic methods, although carefully attended to in other points; and taking the general run of hospital patients, such as we see in Bombay, the total difference, if there be any at all, is possibly in favour of the native. He drinks less alcohol, and is more temperate and abstemious in every way than the European. Still, against these advantages must be placed the fact that the native suffers more from under-feeding and scurvy. In discussing a matter of this kind, circumstances other than those of race and habits are often overlooked. Climate, for example, has much to do with the process of wound healing, not to mention the varying characters of the local surroundings. It is, or ought to be, well known that severe wounds heal much more readily in a dry than in a moist climate. I see good grounds for concluding that any differences which may possibly exist in the matter of wound healing are entirely independent of racial influences. Other things being equal, the tissues in both races seem to me to be endowed with precisely the same degree of reparative power.

Operative Surgery :—Excluding the ordinary obstetric and the lesser gynecological operations, the practical surgery of the past year comprised 743 operations classed under the heading "Major" in the returns, and 3,890 under the heading "Minor." The latter included amputations of fingers and toes, opening of small abscesses, circumcision, aspiration of hydrocele, extraction of teeth, removal of small tumours, and incisions for various purposes. Nearly the whole of these were performed by the senior students under the superintendence of the Second Surgeon. Amongst the "Major" operations the most important were three *Amputations* at the shoulder joint,

13 of the arm, 5 of the fore-arm, and one of the hand. All of these were primary operations for injury. There was one death—a fore-arm case, and this was due to other injuries caused by an explosion. In the lower extremity there were three amputations of the thigh and two at the knee-joint, all for injury: two of the former and one of the latter died from the combined shock of the operation, and of other injuries and hæmorrhage. There were six successful amputations of the leg, three for injury and three for disease. Syme's amputation was successfully done on seven occasions, five of which were for injury. In nearly every case of amputation there was primary union, the only exceptions being where the injuries were extensive, and an attempt was made to save damaged tissue. *Ligature of arteries* was twice performed, with success, on the brachial and superficial femoral, for aneurysm at the bend of the elbow, and of the popliteal, respectively. *Tracheotomy* was done on two patients for syphilitic disease of the larynx, with permanent relief in both cases. *Herniotomy*, for strangulated inguinal hernia, was performed 15 times' with six deaths. It is hardly necessary to say that the fatality was due, not to the operation, but to the late period at which relief was sought. In each case where the state of the parts, or of the patient, permitted, the sac was removed and its stump fixed in the ring, with the object of obtaining something at least in the shape of a radical cure. The success of this procedure is most gratifying. It may be interesting to note that in two successive instances—adults—the hernia was congenital, a most rare condition as far as our experience here goes. *Radical cure of Hernia* was undertaken in ten cases, with excellent results in every one of them. The operation which we prefer is very simple and easily done. The usual incision for herniotomy is made, the sac opened, and the finger introduced: this facilitates the separation of the sac from its connexions, and avoids damage to the structures of the cord. The sac is next freed well into the canal; is then drawn down, a silk ligature applied round the neck, and all below removed. The stump is now secured in the ring,

and the pillars of the latter are brought together with either silk or wire sutures, one or more of which are made to transfix the stump of the sac. Lastly, the wound is closed with deep and superficial sutures and dressed with a pad of absorbent cotton, with a firm bandage over all. The dressings remain untouched for ten days, by which time union is found to be complete. The patient is kept on his back for a month longer, in order to ensure firm union and consolidation of the parts. So far, in all the cases we have been able to watch, the cure appears to be permanent. We attach great importance to having the patient's bowels perfectly empty at the time of operation, and as far as possible we keep them at rest until the first dressing is removed. This preserves the parts undisturbed during healing, and keeps him clean besides. *Lateral Lithotomy* was performed 19 times, chiefly in children, and the suprapubic operation once. Two cases, both old and worn out patients, died. *Lithotrity* was done on 31 occasions, both in children and adults, with recovery in every instance. *Removal of the entire penis* for epithelioma was undertaken in four cases, with one death. The fixation of the urethra in the perineum, just in front of the anus, is a very great improvement on the old operation in advanced cases of disease, and adds much to the comfort of the patients. The splitting of the scrotum is quite unnecessary: ample space can be obtained without this procedure, wile healing is facilitated. Our patients usually stipulate for the retention of the testes. *Laminectomy,* in the dorsal region, for old spinal fracture followed by persistent paraplegic symptoms, was once performed, but without benefit. There was no pressure exercised by displaced fragments posteriorly, but in front the cord was injured by a fragment from the fractured body, and a large abscess, projecting into the mediastinum, had formed opposite this point. The patient lived for several days and eventually died of exhaustion. The full extent of the damage was not definitely ascertained until the *post mortem* examination. *Excision* of the hip and knee-joints for scrofulous arthritis was done twice respectively, and of the elbow and wrist once, for the same reason.

One of the hip cases died of exhaustion, and amputation of the thigh has recently been performed with success, in one of the knee cases. All the others resulted in cure. As a rule, patients with joint disease come for treatment when no resource, except amputation, is left: and some of them are past even that. Thirty-six large *tumours* of various kinds were removed, and only two deaths occurred. In one of these latter a bleeding sarcoma at the side of the neck had already drained the patient of blood, and the other was due to the return of a malignant growth. Under the heading "New growths," malignant and non-malignant, the more important points connected with this department of surgery have already been noted. As regards scrofulous cervical glands we now habitually practise complete excision, and at any stage of the disease. We have had several aggravated cases during the past year, all in young Mahomedan women. The operation, though an exceedingly troublesome one, was on every occasion most successful, and the patients were highly pleased with the result. The new treatment seems to be growing in favour amongst these people, and the number of cases coming to hospital is increasing.

I may mention, in conclusion, that we use no other anæsthetic than chloroform, administered, as it invariably has been in the J. J. Hospital, according to the Edinburgh method, and from a simple cone made of three or four folds of lint. No patent apparatus is ever used. It is given on the average from four to five times daily, and during the last ten years only two deaths of patients while under its influence have been recorded. In neither case can death be said to have resulted from the uncomplicated direct action of the chloroform: the previous circumstances, in connexion with the respiratory functions, were such as to render an accident of some kind not altogether improbable. It is scarcely necessary to add that, with so favourable an experience of it, our belief in the perfect safety and efficiency of chloroform as an anæsthetic remains unshaken.

Report on Morbid Anatomy.

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During the year 1890 one hundred and twenty-one *post-mortem* examinations were made, which may be thus classified:—Phthisis 16, Pneumonia 17, Dysentery 15, Renal disease 11, Heart disease 5, Cerebral lesions 5, Bronchitis 4, Anæmia and debility 9, and miscellaneous 39. The bodies were those of unclaimed persons only. Should there be friends or relatives no examination can be obtained: it has been found impossible to overcome the prejudice they entertain against the procedure.

Phthisis pulmonalis.—Of the cases of phthisis twelve occurred among men, four among women; the ages of the men varied between 28 and 48, except that there was one old man of 60, and one lad of 16; the ages of the women were between 20 and 40. Of all the cases, in 10 the phthisis was most advanced at the left apex, and appeared to have commenced there; in 4 the origin of the disease appeared to be in the right apex; in one, in the left base. In two cases, only one lung was affected; in the remainder, tubercles were found in both lungs. In eight cases tubercular ulceration of the intestines was found as a complication. In three cases there were tubercles in the liver; in two, tubercles in the kidneys.

As anomalies, one case may be mentioned, in which both lungs were affected; on the left side there was a large empyæma causing collapse of the left lung, whilst in each base was situated an isolated soft yellow tubercular mass, the size of a walnut. In another case there was a large cavity at the left apex, and a small one at the left base, whilst the tubercles decreased from the apex to the centre of the lung, and increased again towards the base; there was also advanced tubercular ulceration in both Fallopian tubes. In a third case, both lungs being diseased, the only complication was extensive tubercular deposit in the spleen. The most remarkable case

was one in which there was a large branching cavity in the left lower lobe, one small cavity with scattered caseating masses at the left apex, but no tubercle at all in the intervening lung tissue, namely the lower part of the upper lobe; tubercular laryngitis was also found, and ulceration in the jejunum and upper part of the ileum, and slightly in the cæcum, but none in the lower part of the ileum. In all cases, without exception, extensive pleuritic adhesions were found, chiefly of old standing.

Of the cases of *Pneumonia,* 15 were males, 2 females; the males were all adults of ages varying between 18 and 60; it was noticeable that all the cases occurred in the cold weather, viz., between the end of November and the beginning of May, and almost invariably there was a history of exposure to cold with sudden onset of the disease. In 10 cases the pneumonia had begun in the right lung, in 7 in the left, and it was usually confined to one lung, double pneumonia being found only four times.

In about half the cases all three stages of the disease were present; the others were in the first two stages, but mostly in the second, whilst in one case engorgement only was found. In six cases the third stage was well advanced, and the lung was breaking down into separate suppurating cavities. Once the right lower lobe was found to be occupied by a large branching abscess, and once actual gangrene of the lung had occurred. As a general rule, the pneumonia had started at the base of one of the lungs and was spreading upwards, but exceptions were not uncommon; thus in one case it was confined to the two upper lobes of the right lung; in another to the middle lobe and lower part of the upper lobes on the right, in two others to the adjoining parts of the upper and lower lobes on the right, quite posteriorly; whilst there was one instance of pneumonia, which had clearly commenced at the left apex and was travelling down towards the base; in this case the back part of the apex and upper lobe were in the early second stage, the apex being most advanced, whilst the upper part of the lower lobe was in the first stage, the remainder of the lung not affected.

In every case evidences of recent and still active pleurisy were found. There were three cases of secondary hypostatic pneumonia complicating other diseases; two of the patients having suffered from dysentery, and one from acute bronchitis; in one of the latter pneumonia was well in the third stage, and the lung was breaking down into abscesses.

There were 15 cases of *Dysentery*, 12 being males and 3 females. The ages of the men varied between 30 and 70 years, save that there was one lad 18 years old; the females were all adults. In 7 cases the disease was quite recent, both by the history of the case, and the *post-mortem* appearances found: in none was hepatic abscess present. In 5 the liver was normal in size, though rather congested in 2 of these, whilst in the remaining 2 the liver was larger than normal and considerably congested. In 8 cases the dysentery was of long standing; in 3 the liver was normal; in 2 normal in size, but rather congested; and in 3 there was hepatic abscess. In one of these the history was distinct, the dysentery had lasted 2 months, and the hepatic symptoms began in hospital 15 days before death; in the other two both the dysentery and hepatic abscess were found *post mortem* to be of old standing, and it was not possible to say from the appearance or history which had commenced first. In one recent case of only 18 days' duration, a perforation was found in the sigmoid flexure $\frac{1}{3}$ inch in diameter, and there was also recent general suppurative peritonitis.

There were 5 cases of *Hepatic Abscess;* the ages were between 30 and 55 years; 4 occurred between the months of January and April, and one in September. In all the cases the right lobe only was affected, the left being normal; in 3 there was one large abscess in the right lobe associated with chronic dysentery; in one case the abscess had already opened through the diaphragm into the base of the right lung; in another adhesions had formed, and the abscess was about to open in this situation. In two cases the intestines were perfectly healthy; in one no cause for the abscess could be found, either from the history or the *post-mortem* appearances. In the other, a woman, the small intestine contained a large number of

round worms; there were one large and many small abscesses in the right lobe, and two round worms were found in the liver, one in the large abscess, and one in a suppurating bile duct.

Of Renal Disease there were 11 cases. Nine were chronic Bright's disease, 7 being cases of contracted granular kidney, and 2 of large white kidney. Of the former 2 were 38 years of age, the rest between 50 and 70; the two latter were below 30 years. Six of these chronic cases were males, and 3 females. Hypertrophy of the left ventricle was found five times; in one case of contracted granular kidney, a small calculus was found in the pelvis of the kidney. The two acute cases occurred, one in a man of 36 and one in a woman of 24 years: in both, the kidneys were of the large deep-red variety, and there was general œdema with effusions into serous cavities. In none of these renal cases were any cerebral lesions found.

Heart Disease.—There were 5 cases, 3 men and 2 women. All were of adult age or more, varying between 25 and 75 years. In two cases both the aortic and mitral valves were diseased; in one the aortic alone, and in one the mitral alone. In the fifth case all the valves were diseased; the aortic cusps being thick, rough, and unable to close, the mitral valve extremely contracted; the pulmonary valve incompetent, resembling the aortic, and the tricuspid contracted like the mitral, but to a less degree. The right side of the heart was much dilated and hypertrophied: there was pericarditis with effusion, old and recent pleurisy, 'nutmeg liver,' and congestion of all other organs. The case was that of a woman aged 30.

Cerebral Lesions.—There were five cases, which may be shortly described as follows:—

Left Hemiplegia.—Man, aged 50 years. Brown staining, due to old hemorrhage, on outer surface of right cerebral hemisphere, from behind fissure of Rolando, along the parietal lobe to 1½ inches from hinder end of cerebrum. Duration of illness unknown.

Left Hemiplegia and left Facial Paralysis.—Man, aged 50; duration of illness 7 weeks. Cerebral arteries very atheroma-

tous; right lenticular ganglion and the corona radiata covering it, occupied by an extensive hemorrhage, not reaching the surface. Hemorrhage consisting of chocolate coloured granular *debris*, microscopically breaking down blood corpuscules, and granular matter. Aorta very atheromatous, kidneys sessile.

Cross-Paralysis.—Woman, 35. Right facial paralysis, with left hemiplegia. About six months' duration. Softening and disorganisation of right crus just at its junction with the pons, as well as of the adjacent part of the pons. Vessels of brain healthy.

Right Hemiplegia.—Man, 65. Arteries at base of brain very atheromatous, left middle cerebral rigid and calcareous. Posterior portion of the left internal capsule quite soft and disintegrated. Aorta very atheromatous, left ventricle slightly hypertrophied, left kidney 'early granular.' Duration of illness unknown.

Right Hemiplegia.—Woman, aged 30; duration of illness four months. Arteries of brain healthy. The left corpus striatum and anterior third of the optic thalamus soft and disorganised. No actual hemorrhage, or secondary descending degeneration found.

Amongst the miscellaneous cases the following were of special interest :—

Angioma, of four years' duration, in a man, aged 27. *Post mortem* made on 24th January 1890, 8 hours after death. The body that of a young man, rather thin. A large tumour was seen extending from the posterior border of the right axilla above to the 10th rib below, forwards to the mid-axillary line, backwards nearly to the spine. It felt solid and movable; at its lower and back part the skin over it was black, rough, and wrinkled, and here and there was an oval patch of ulceration, $1\frac{1}{2} \times 1$ inch, covered by a dark blood-clot. At the centre of the upper margin of the tumour, an artery and vein were found to have been ligatured; the ligatures were not distinctly made out; both vessels were occluded, and in the vein a firm organised clot was found, below

the seat of ligature. On section, the subcutaneous tissue over the tumour was found to be firm and tough, it looked like compressed fibrous tissue; it was thickest at the lower parts, about 1 inch thick here. The tumour was found to extend below the latissimus dorsi towards the spine, and it also extended for some distance beneath the serratus magnus, against the chest-wall, but was not attached to the ribs. It had no capsule, and was removed with difficulty, as it spread into the muscles and was incorporated with them. In structure the tumour was found to consist of firm fibrous tissue and vessels, the latter being quite empty, they traversed the tumour in all directions, being very tortuous, and joining each other frequently; many of them had quite thin walls, resembling sinuses more than vessels. The largest were of the size of goose-quills. The large artery which had been ligatured was traced to the axillary artery; the others were derived from the muscular arteries of the part. The whole body was anæmic, containing little blood. *Heart*—400 grams. Very pale, containing a little thin watery blood, no clots. The pericardium contained six ounces of clear straw-coloured fluid; otherwise normal. *Lungs* were very dry, containing hardly any blood, or secretion: they were of slate-gray colour. *Liver* pale, almost bloodless. *Spleen* rather large: these organs contained a little pale watery blood: they were otherwise normal. There were 7 ounces of clear straw-coloured fluid in each pleural cavity, and 10 ounces in the peritoneal cavity.

Hydatids of Spleen, Lardaceous Liver.—Woman, aged 38: had suffered from abdominal pain and diarrhœa for four months: a history of syphilis, but no signs of it: great enlargement of liver and spleen: died 11th February 1890. *Post-mortem* 20 hours after death.

Spleen large, 1,350 grams. Some old adhesions to diaphragm and liver. Its inner surface was rounded, bulged, and fluctuating. On section 20 ounces of hydatid cysts were removed. *Liver*, 2,170 grams, large, solid, heavy, smooth on surface, its edge sharp, colour light-red, surface glistening

On section it was dry, containing little blood, was firm, pitting only slightly on pressure, and not easily breaking down: its cut surface was shiny, like red wax; the separate lobules could not be seen. There was a little watery bile in the gall-bladder. The test for lardacin was readily obtained. There were rather firm adhesions of the liver to the spleen and diaphragm. *Heart* small, flabby, normal. *Lungs*, some hypostatic congestion, and recent pleuritic adhesions, otherwise normal. *Kidneys* rather pale, otherwise normal, except that the capsule did not strip easily. *Intestines* normal. *Uterus*—At the back part of the fundus, a pedunculated hard fibroid tumour, with irregular surface, the size of a large walnut. The ovarian end of the right Fallopian tube was expanded into a thin-walled pyriform cyst, containing 4 ounces of clear straw-coloured fluid. No organs, save the liver, were lardaceous.

The cysts were of various sizes, from a small marble to a large hen's-egg, their capsules were all soft, gelatinous, and readily lacerable, their contents semi-fluid and gelatinous. Some cysts were quite clear, but many of them had partly caseous, partly gelatinous, walls and contents. Besides the cysts there was a considerable quantity of yellowish-white caseous curdy matter, looking like putty, without any smell. All these cysts and curdy matter were contained in one large mother-cyst which lined the splenic cavity; the wall of this was soft, transparent, gelatinous, and it could be separated in layers. After removing the hydatids, the speen was found to contain a large cavity; the outer surface of the organ looked normal and was $\frac{1}{8}$ inch thick, its lower margin for one inch upwards was normal tissue. The internal surface of the cavity was generally smooth, but on it were found small yellow curdy patches like the curdy matter in the mother-cyst, but harder. The spleen tissue did not give the test for Lardacin.

Report for 1891.—During this year 154 *post-mortem* examinations were made, distributed as follows:—Phthisis pulmonalis 33, Pneumonia 19, other pulmonary diseases 15, Kidney

diseases 14, Heart disease 5, Liver diseases 16, Dysentery 10, Nervous diseases 13, and miscellaneous cases 39.

Phthisis pulmonalis.—The age in the cases of phthisis was between 20 and 60 years, most of them being below 40 years; in all the cases tubercles were found in both lungs. In 4 of the cases tuberculosis of the larynx was found; namely, ulcers just behind the true vocal cords, with superficial ulceration of the epiglottis, as well as of the upper part of the trachea; in one case the arytenoid cartilage was exposed, and denuded of its perichondrium. In 17 cases there was tubercular ulceration of the intestines; in one case the ulcers were unusual, instead of having their long axis transverse, they all lay with their greatest length parallel with the direction of the intestine, and not at right angles to it, as commonly occurs.

In 8 cases tubercle was found only in the lungs, but in no other organs; in 2 of these the phthisis was recent, the tubercles miliary, and confined to the apices; in one there was universal miliary tuberculosis of both lungs; whilst in two others, though the tubercles were few, there was much recent pneumonic consolidation about them, and this pneumonia appeared to have caused the patients' death. One patient had died of hæmorrhage; there was phthisis of both lungs, with a cavity the size of an egg in the middle of the right lung; a vessel in its wall had ruptured, and the cavity, as well as the branches opening into it, were full of blood.

One case was curious, that of a man aged 30; during life he had all the usual symptoms of phthisis, with profuse diarrhœa; at the *post mortem* tubercles were found in both lungs, and a large number of round worms in the intestines; but there was no tubercular ulceration of the intestines at all.

Five of the cases, entered above under the heading 'phthisis' for convenience, were in reality cases of general tuberculosis. In two there were tubercles in the lungs, bronchial glands, liver, spleen, kidneys, intestines; in one of these, there was only one kidney of the horse-shoe shape, with two ureters. In the three other cases, in addition to the organs mentioned above,

there was also extensive peritoneal tuberculosis; in two of these the mesenteric lymphatic glands were converted into large, smooth, rounded, nodular masses, adherent together; they were caseous for the most part, but softening here and there.

Three cases of some interest may be mentioned; in one there was phthisis of both lungs; but whilst there were only a few scattered tubercles at the apices, without any consolidation, there was much tuberculosis beginning two inches below the apices, and the lungs were breaking down into cavities in this situation. In the second, the left lung was stuffed with tubercles, mostly at the apex, diminishing from above downwards, but there were no cavities; in the right lung there was a solid tubercular mass, the size of a pigeon's egg, quite at the apex, a similar but larger mass at the lower and outer part of the upper lobe, and a third similar mass at the lower and outer part of the lower lobe; whilst the remainder of the lung was quite crepitant, containing only a few scattered tubercles.

In the third case there was a cavity at the right apex, with tubercles nearly down to the base; the left apex was normal, but below it there were tubercles extending half-way down the lung, chiefly in front.

Pneumonia.—Of the cases of pneumonia the following were noteworthy. In one the right lung was affected from above downwards; the upper lobe being in the grey stage, the middle and upper part of the lower lobe in the red stage, the base in engorgement. In another the right apex was gangrenous, the rest of the upper, and the middle lobe, being in the second and third stages; the patient had been a fireman, and both his lungs were intensely black. In another, there was pneumonia at the middle-posterior part of the left lung with extensive gangrene; this man had been the subject of molluscum fibrosum, and his whole body was covered with the small nodules, characteristic of the disease. In another, the left lung was solid from the apex to three inches from the base, the pneumonia being in the second stage; whilst there was also extensive recent pericarditis.

In two other cases, the pneumonia was confined to the left upper lobe, and was in the second stage. In another, nearly the whole of the right lung was in the second stage, whilst the apex only of the left was in the second and third stages.

In another, there was extensive general bronchitis of both lungs, with pneumonia, in the red and grey stages, confined to the middle lobe of the right lung. In another case, the lower back part of the right upper lobe was in the second stage; this man also had firmly adherent pericardium of old standing, with small calcareous plates in the pericardium, extensive old and recent pleurisy, and a gôitre.

Other Pulmonary diseases.—With reference to other pulmonary diseases, the majority of the cases consisted of acute and chronic bronchitis. In two cases of chronic bronchitis occurring in old men, extensive pulmonary emphysema was found, chiefly at the apices, inner surfaces, and anterior margins of the lungs; and in two cases of rather acute bronchitis, aged respectively 20 and 30 years, there was also much emphysema with pulmonary collapse. The case of the man aged 20 was interesting: there was acute general bronchitis and some of the smaller bronchial tubes were dilated, ulcerating and breaking down into abscesses; there was much alveolar emphysema, interspersed with patches of collapsed lung, together with pleuritic adhesions, binding the lungs to the thoracic walls, and the various lobes to each other. In the right lung the emphysema had burst into the adhesions between the upper and lower lobes; it had thence travelled to the loose areolar tissue at the root of the lungs, as well as to the outer surface of the pericardium, which was distended in parts into blebs like bunches of grapes; it had also travelled up behind the trachea and larynx to the subcutaneous tissue of the neck, and thence over the left half of the chest and abdomen as low as the umbilicus, extending back nearly to the spine, and also to the left shoulder, and a little way down the left arm.

One other case of acute bronchitis, in a man aged 35, was noteworthy, as there was also the unusual complication of acute pyelitis. The pelvis of each kidney was deeply

engorged, and extravasation of blood had occurred; the urine found in the bladder contained much blood.

Heart disease.—In one case, a woman aged 40, the pericardium was adherent, the surface of the heart fatty; there was a localised dilatation at the apex of the left ventricle, the size of a walnut—an aneurism of the heart; the endocardium of the left ventricle was thick, white, and calcareous in parts; the mitral valve was thick, rigid and contracted, 'button-hole,' and one cusp of the aortic valve was also thick and rigid. In another case, an African sailor, 48 years old, there was a rupture through the left and posterior cusps of the aortic valve, $\frac{3}{8}$ inch long, the left ventricle much dilated and hypertrophied, the mitral valve widely dilated. Both kidneys were small, with adherent capsule, in the typical contracted granular condition; they were studded with small cysts, and the cortex reduced to a mere line.

In another case, a Eurasian, 45 years of age, the pericardium was adherent, and in it near the base of the heart were some hard brittle calcareous plates; the mitral valve was much contracted, puckered and rigid, and calcareous, the auricles and right ventricle were much dilated and a little hypertrohpied, and the tricuspid valve dilated. In addition, the kidneys were in the contracted granular state; the left quite small, its cortex wasted, capsule adherent, surface rough, and cysts in its substance; the right in an earlier condition of the same affection.

Liver diseases.—Cirrhosis of the liver was found six times, in one case the liver was in the typical early condition of alcoholic cirrhosis; the man's whole body and each organ smelt strongly of country liquor. In another case, where there was a history of drink, the liver had all the appearances of alcoholic cirrhosis; but instead of being small, it weighed 2,200 grams, and was nearly double the normal size; all the connective tissue seen in it was soft and glistening.

In two cases the liver was in the condition of atrophic cirrhosis, of advanced type; in these the spleen was large, its capsule thickened, and its fibrous stroma increased, and there

was a history of prolonged malaria; in a third case the same *post mortem* appearances were found, but there was no history of malaria.

There were seven cases of abscess of the liver; in three of these old dysenteric ulcers were found in the large intestine, the dysentery seeming to be quite as old, or older than, the hepatic abscess; in two there was a history of alcohol; but no history or *post mortem* evidence of dysentery; whilst in the remaining two there was nothing in the history to account for the abscess. In one of these there were two separate abscesses in the right lobe, both chronic; and there was extensive recent acute dysentery, from which the patient appeared to have died. In all the cases the abscesses were situated in the right lobe, and most commonly in the lower and outer portion of this lobe; in one case the liver contained three abscesses, one in the upper part of the right lobe, one near the gall-bladder, and another small one between them; in another case, mentioned above, there were two abscesses, in the remainder there was only one. One abscess had spread from the right lobe, behind the peritoneum, down the outer side of the right psoas almost to the pelvis, and it contained old thick curdy pus; in another case the abscess had burst into the base of the right lung, and the lower lobe of the lung was converted into one large abscess. In one case the abscess had been treated by incision and drainage below the right ninth rib; at the *post mortem*, it was found that there were no adhesions at all between the liver and the abdominal wall, the liver being only supported by the usual ligaments; yet there was not the slightest trace of any peritonitis.

Dysentery.—There were ten cases of dysentery, five being acute and recent, five of old standing. Of the acute cases, in two the liver was found to be quite normal, in one it was small and anæmic, there being general bloodlessness of all organs; and in two the liver was rather large, and there was marked portal congestion. Of the five chronic cases, three have been mentioned above, as being complicated

with liver abscess; of the remaining two, in one the liver was smaller than normal, in the other it was larger, and there was much portal engorgement.

Diseases of the Nervous system:—There were five cases of acute cerebral meningitis; in one there was a history of prolonged malaria, all the organs were congested, and the meningitis was early. In one the meningitis was secondary; at the *post mortem* were found pneumonia, with much pleurisy, of upper lobe of right lung; an abscess in the muscular wall of the left ventricle of the heart, with recent pericarditis; many recent abscesses scattered through the spleen with peri-splenitis; suppuration in the left wrist-joint, and very extensive recent meningitis, the effusion over the brain being mainly lymph, becoming purulent in parts. The case is entered under meningitis for convenience. In the other three cases, the patients were brought to hospital in a dying state, and the cause of the meningitis could not be ascertained.

One *post mortem* on a case of acute tetanus was made; all the organs were deeply engorged; the pia matter was engorged, the 'puncta cruenta' prominent, and some engorged vessels were found on the floor of the fourth ventricle; the vessels on and in the spinal cord were also congested. There was an old healed wound on the right foot; all the tissues around it looked quite normal.

There were four cases of hemiplegia. In one there was right facial paralysis with right hemiplegia; the left half of the pons was soft, diffluent, breaking down; the basilar and cerebral arteries generally were atheromatous; there was atheroma of the aorta, and one shreddy atheromatous ulcer on the aortic valve. In the second, there was right hemiplegia; the left crus cerebri was soft, and there was a soft patch in the left half of the pons; there was much atheroma with ulcers in the aorta, much atheroma with rigidity of the cerebral arteries. In the third, also right hemiplegia: the left cerebral ventricle was full of recent clots and blood, the left corpus striatum and the posterior part of the left optic thelamus were destroyed by a recent hemorrhage; the mitral valve was diseased, it was

thick, soft, with many vegetations; the arteries of the brian were not atheromatous, nor was the aorta. The fourth was also a case of right hemiplegia; there was a soft yellow patch of debris, the size of an almond, in the left cerebral hemisphere, just above the corpus striatum; the left crus cerebri, the left half of the pons, and medulla, were all narrower than the corresponding parts on the right side, due to descending degeneration of nerve fibres.

There were two cases of myelitis; one was acute ascending myelitis: the first four inches of the spinal cord were normal; the rest of the cord down to four inches from the lower end was soft and diffluent, just like butter; the vessels of the spinal pia matter were much congested; there was secondary pneumonia at the bases of the lungs. The other case was also acute: there was white softening of all the lumbar cord, this part of the cord being quite diffluent; the patient had suffered from syphilis.

There was one case of cerebral abscess; the abscess was chronic, the size of a hen's egg, and was situated just behind the posterior cornu of the right ventricle; from here it had burst into the ventricle, so that this cavity contained much pus; the pus was yellow, but had no bad smell.

Anatomical Peculiarities, observed in Grant Medical College Dissecting Room,

By Vinayak Sokarji Trilokekar, L. M. & S., Tutor in Anatomy, Grant Medical College.

The peculiarities in the origin, course and distribution of arteries, veins, &c., described here are such as have not been derscribed in many of the works on Anatomy. Ordinary deviations from the normal are not recorded.

Brain—Circle of Willis.—There were two anterior communicating branches connecting the two anterior cerebral arteries. The posterior of the two was situated in front of the optic commissure and passed transversely, connecting the two anterior cerebral arteries about half an inch in front of their origin from the internal carotid arteries. The anterior one also connected the two vessels and was situated a quarter of an inch in front of the preceding. In front of the optic commissure, therefore, was formed an arterial square, bounded in front and behind by the two communicating branches and laterally by the anterior cerebral arteries.

Neck.—External Carotid Artery.—The external carotid artery gave off nine branches, the ninth branch being the superior laryngeal. This abnormality was seen on the right side of the neck in one case, and on the left in another case. The superior laryngeal (branch) was given off from the anterior part of the external carotid above the origin of the superior thyroid, and between it and the lingual artery. It then accompanied the superior laryngeal nerve, pierced the thyro-hyoid membrane and was distributed to the parts supplied by the superior laryngeal branch of the superior thyroid. The hyoid branch of the superior thyroid was also replaced by a branch given off from this superior laryngeal trunk.

Inferior thyroid.—I have recently read the second annual report of the collective investigation Committee of the Anatomical Society of Great Britain and Ireland for the year 1890-91. In this the mode of origin of the branches of the

thyroid axis is fully described : 544 cases were examined, and the result is given in a tabular form. I, however, did not come across any peculiarity of origin, like the one which I now proceed to describe. The inferior thyroid was absent on the left side. The right inferior thyroid artery was given off as usual from the right thyroid axis, and after having given off the ascending cervical artery, passed behind the common carotid artery and the internal jugular vein, to the under surface of the thyroid gland, giving off during its course the laryngeal, tracheal, œsophageal and muscular branches. The artery having supplied the thyroid body passed between the trachea and œsophagus to the left side of the neck, and having appeared at the lower border of the thyroid body (on the left side) supplied the gland, anastomosing with the left superior thyroid and gave off the laryngeal, tracheal, œsophageal and muscular branches. The ascending cervical artery on the left was given off from the transversalis colli, and took its usual course between the scalenus anticus and rectus capitis anticus major. The left thyroid axis gave off only two branches, namely, the transversalis colli and the suprascapular.

Vertebral Artery.—On the left side this artery sprung from the arch of the aorta, instead of from the subclavian. The artery, therefore, was longer and more deeply seated than the right. It was given off from the transverse portion of the arch of the aorta. It then passed upwards behind and between the left subclavian and common carotid arteries ; the artery next passed through the superior opening of the thorax and entered the foramen in the transverse process of the fifth cervical vertebra. The relations of the artery in the neck were :—In front of it, were the left pneumogastric nerve and internal jugular vein ; on its right side the left common carotid artery and to the left the subclavian artery.

Omo-hyoid Muscle.—This muscle was seen to arise, not from the superior border of the scapula, but from the middle of the posterior border of the clavicle. The muscle passed obliquely upwards and blended with the outer border of the left sterno-hyoid muscle, the two muscles being inseparably

connected with each other. There was no muscular or fibrous (aponeurotic) prolongation from the posterior body of this muscle to the superior border of the scapula. As usual the muscle was kept in position by a slip of the deep cervical fascia.

Thorax—Pulmonary veins.—There were six pulmonary veins opening into the left auricle. There were the usual two veins on the left side, while there were four distinct veins on the right side. From the upper lobe of the right lung the blood was carried to the left auricle by two veins. The third vein carried the blood from the middle lobe, while the lower lobe sent the blood through the fourth vein. The vein from the middle lobe was placed on a plane posterior to the other three pulmonary veins. All these four pulmonary veins passed behind the right auricle and the ascending portion of the arch of the aorta and opened into the left auricle.

Upper extremity—Ulnar artery.—In four cases the artery was given off by the axillary artery, while in eight cases it arose from the brachial artery at the lower border of the latissimus dorsi muscle. In all these cases the artery was quite superficial to the flexor muscles of the fore-arm, being covered by the superficial fascia and the integument. The anterior ulnar recurrent artery was given off from the ulnar, while the posterior ulnar recurrent arose from the common interosseous artery which, with the radial, formed the two divisions of the brachial artery. The anterior carpal artery sprung from the ulnar.

Superficial Palmar arch:—There was no superficial palmar arch in three cases. The ulnar artery supplied both sides of the little and ring fingers and the ulnar side of the middle finger, the superficialis volæ did not form any arch. It supplied the muscles of the thumb. The radial side of the middle finger and both the sides of the index finger and the thumb were supplied by the branches of an arterial trunk of the size of the radial artery. This artery (median) was given off from the common interosseous on a level with the posterior ulnar recurrent. It then passed between the

two heads of the pronator radii teres, accompanying the median nerve. Having given off the median artery it passed between the superficial muscles of the fore-arm to the wrist. It then passed beneath the annular ligament and the palmar fascia into the palm and divided into three principal branches which supplied the fingers in the way already described. The deep palmar arch was present and communicated with the deep branch of the ulnar artery. In another case the superficial arch was also absent. The ulnar supplied the ulnar side of the middle finger and both the sides of the little and ring fingers. The radial side of the middle finger and both the sides of the index finger and the thumb were supplied by the superficialis volæ, which was of a large size and did not form an arch with the ulnar artery.

Abdomen—Benal arteries.—There were six renal arteries in one case—three on the left side and three on the right. On the left, the upper or first renal artery was given off from the abdominal aorta below the origin of the superior mesenteric, and about 3 inches above the bifurcation of the abdominal aorta, and passing horizontally outwards entered the substance of the left kidney above the upper border of the pelvis of the kidney. The origin of the middle or second renal artery was an inch and three-quarters below that of the first. This artery entered the substance of the kidney near the pelvis; while the third or lower renal artery was given off from the aorta an inch and a half above its bifurcation, and entered the substance of the kidney below the lower margin of its pelvis. The mode of entering the substance of the kidney was the same on the right side; the mode of origin varied slightly, the upper one was given off below the origin of the superior mesenteric artery and opposite to that of the left side; the second or middle an inch below the first, and the third two inches below the second. These vessels were small in size. The left spermatic artery was a branch of the left upper renal.

Rectum:—The rectum was situated to the right of the sacrum in front of the right sacro-iliac synchondrosis. The descending colon terminated in the sigmoid flexure, which

retained its usual position, in the iliac fossa. The intestine then passed transversely to the right, across the spine, lying in front of the lumbo-sacral articulation, and describing in its course a horse-shoe shaped curve with its convexity upwards and concavity directed downwards towards the pelvis. The gut then passed downwards in front of the right sacro-iliac articulation. In the pelvis the rectum was situated at its upper part on the side of the sacrum, and not in the middle line. At its lower third it approached the middle line and opened at the anus. The horse-shoe shaped curve of the gut was kept in position by a fold of peritoneum which enclosed it and formed a mesentery which was attached behind to the last lumbar vertebra. The cæcum was situated in the lumbar region, owing to the rectum having encroached upon the iliac fossa. There was no vermiform appendix.

Great omentum :—The great omentum, the lower border of which is normally situated midway between the umbilicus and the symphisis pubis, passed downwards in front of the coils of the small intestines into the pelvis and behind the broad ligament, and was closely connected with the peritoneal layers covering the posterior surface of the uterus and the anterior surface of the upper portion of the rectum. It was not possible to separate the different layers of the peritoneum, as they were closely united to each other at this part. There were no signs of recent or old inflammation or peritonitis anywhere in the abdomen.

Case of Wholesale Strychnia Poisoning.

By Surgeon T. D. C. Barry, Professor of Chemistry and Medical Jurisprudence, Grant Medical College, and Chemical Analyser to Government.

The following case of strychnia poisoning is interesting from the fact that the symptoms present certain differences from those usually observed in poisoning by strychnia. I purpose therefore to first sketch the history of the case and afterwards discuss in detail the points of special medico-legal interest.

Buchoo Haji Abdulla, the son of a wealthy Memon, residing with his father in Kambekar Street, Bombay, was arraigned before Sir Charles Sargent, Chief Justice of Bombay, on the 15th of April 1891, on a charge of murdering five persons by poisoning them with strychnia.

On the night of January 21st, 1891, information was brought to the police that three persons had died, and that the relatives were trying to dispose of their bodies secretly. Shortly afterwards information arrived that two more deaths had occurred in the same house. Acting Superintendent Cobb and Inspector Nolan proceeded to the house indicated, and there found four dead persons, the fifth (a woman) having been taken away by her relatives to a house in another street. All preparations were on foot for the final disposal of the bodies. The names of the deceased persons were—(1) Haji Abdulla Nur Mahomed, æt. 56 years, father of Buchoo above mentioned; (2) Haji Moolodina Nur Mahomed, æt. 73 years, paternal uncle of Buchoo; (3) Kareemabhai, æt. 70 years, stepmother of Abdulla; (4) Haleemabhai, æt. 54 years, wife of Moolodina; and (5) Fatimabhai, æt. 65 years, servant of Abdulla.

The house in Kambekar Street, in which the four bodies first mentioned were found, is a four-storied house, and in the front room of the third floor the bodies of Abdulla and

Moolodina were lying, and in the front room of the fourth floor, those of Haleemabhai and Kareemabhai. The bodies were all lying on beds and were all rigid; the stomach of each hard and distended; the fingers clenched and the thumb flexed and covered by the other fingers; the toes also tightly flexed; the shoulders drawn upwards, and the body bent in slight opisthotonos.

Enquiries having been made amongst the surviving relatives of the deceased persons, it was ascertained that at about 8-30 p. m. of the night in question, Buchoo and his father took their milk and rice at the same time in the same room, the milk being in a separate cup for each and the rice on one common plate. Half an hour before the above took their food Moolodina took his food with his grandson at 8 p. m. Haleemabhai took her food alone at 8 p. m.; Abdulla and Buchoo, as above stated, at 8-30 p.m.; Kareemabhai and Rahimatbhai, wife of Buchoo, at 9 p.m.; Fatimabhai, the servant, and Dawood, the cook, about 9-30 p.m. All took milk in separate cups, except Fatimabhai, who ate a kind of curd curry. The method of eating amongst Mahomedans is as follows:—A small quantity of rice is taken from the plate by the fingers, is slightly pressed together, and then dipped into the milk and swallowed. The separation of the food abovementioned thus made it comparatively easy to select the victims for poisoning.

About 11-30 p. m. Abdulla had gone to visit a friend; while there Moolodina came and told him that Haleemabhai was very ill, and they went together to the house of a native hakeem who went with Moolodina to see Haleemabhai; Abdulla not feeling well remained in the verandah of the hakeem's house, and while sitting there became worse, suffering from abdominal pain and convulsions, and crying out to the passers-by to hold him down. After a few minutes he died. Shortly after, the hakeem returned with some of Abdulla's relatives (who had come upon receiving news of his condition) and pronounced him dead. His body was taken to his own house and placed on a bed on the third floor. His

brother Moolodina, who had come down from the fourth floor to inquire for him, was seized with convulsions upon seeing him, and fell down. He was raised up, but was unable to stand, and became convulsed and cried for water, but before it was brought he had expired. His body was placed on another bed in the room of Abdulla. The servant Fatima, who had come into the room, was immediately, upon the death of Moolodina, seized with convulsions and complained of severe pains, with burning at the pit of the stomach, and thirst. She was removed into a back room and her relatives were sent for. They came at once and found her still in convulsions, complaining of thirst and asking to be held down; she said to her brother "Buchoo and Rahimatbhai have played the same trick upon me that they have on Abdulla and Moolodina." She then died and her body was at once removed to her brother's house by order of Buchoo. During this time, Haleemabhai, who was first taken ill, was lying in her bed on the fourth floor, attended by Kareemabhai, who came down to the third floor on the arrival of Abdulla's body and remained there until Fatima's death (which took place a little before 1 a.m.); Kareemabhai then returned to the fourth floor and found Haleemabhai dead. She at once dropped down in convulsions and complained to Dawood, the cook, who was also present, of severe pain in the stomach. She was placed on a bed and died in a few minutes in severe convulsions.

The deaths took place between 12 midnight and 2 a.m., and were attributed by the relatives to various causes :—To long-standing asthma and blood-spitting, in the case of Abdulla; to debility, in the case of Haleemabhai, who was said to be "dying that night;" to old age and asthma in Moolodina; and to grief and shock in Kareemabhai and Fatimabhai. All this was testified to by the hakeem who was not only their medical adviser, but also their spiritual leader; he, moreover, stated to the police that there was no foul play. The bodies were then sent to the mortuary, where a *post-mortem* examination was held and the opinion given that they had all

died of "heart disease"! The viscera, however, were forwarded to the Chemical Analyser, and strychnia was detected in the stomachs of each of the deceased.

The following is a detailed report of the analysis, 76 separate analyses having been made in all:—The viscera of the deceased persons were forwarded in ten bottles, in five of which were the stomach, and its contents, of each of the victims separately, while the other five held the liver and spleen. The contents of all the bottles were first tested for arsenic by Reinsch's process and then treated by Stas' process. The absence of opium having been ascertained, the process for alkaloid extraction was completed, when the extracts from those bottles containing "stomach and contents of stomach" gave the following results:—

Potassio-iodide of mercury, perchloride of gold, and tannic acid, gave well marked reactions. Black oxide of manganese and sulphuric acid, gave the characteristic coloration of strychnia. Letheby's galvanic test answered perfectly in each case, the violet colour being unmistakable. Guy's test also answered well. The crystals of the extract were easily recognizable under the microscope. Fifteen minims of the extract injected hypodermically beneath the skin of a frog produced tetanic spasms in three minutes, and death in seven minutes. The effects produced in the extracts from the viscera of the several persons were markedly similar in point of intensity, the same quantity of extract producing death in the animals experimented upon, in almost exactly the same period of time. The "iodine alcohol" test gave characteristic stellate groups of crystals. Nitric acid, mercurous nitrate, and methyl iodide gave no evidence of the presence of brucine.

Now, with regard to the physiological aspect of the case, it will at once be observed that the time intervening between the ingestion of the poison (supposing the time alleged to be correct, as there appears to be no reason to doubt) and the first appearance of the symptoms was very much longer than the average time which strychnia takes to act. The period in this case varied from three hours and three-quarters to five

hours and three-quarters. Most authors state the average time at "ten to twenty minutes." Lyon states five to twenty minutes as the usual interval, but gives one case in which the symptoms were delayed for "two hours." This case is most probably the same as that recorded by M. Pellarin and mentioned by Taylor, where a man took 300 grains of nux vomica, and the symptoms, when they did appear, culminated very rapidly in death. Unfortunately, the time of the commencement of the symptoms is more often than not omitted by most of those writers who have contributed to our knowledge of strychnia-poisoning by reporting unusual cases, most probably because reliable information is not to be obtained on this point.

In one case, mentioned in the *Lancet*, the symptoms were delayed for three hours, and death followed within ten minutes. From the records of twenty-seven cases given by Woodman and Tidy, I have derived the following details:—

In 20 cases the symptoms set in within 20 minutes.

,,	2	,,	,,	,,	30	,,
,,	1 case	,,	,,	,,	45	,,
,,	1	,,	,,	,,	1	hour.
,,	1	,,	,,	,,	$1\frac{3}{4}$	,,
,,	1	,,	,,	,,	2	hours.
,,	1	,,	,,	,,	3	,,

It will be seen that the deaths of the five persons in the Bombay case took place between four and six hours after the ingestion of the poison. Woodman and Tidy state, as the longest time on record, "six hours" and give four cases in which death occurred six hours after swallowing the poison, and in giving the results of thirty-five cases, mention that:—

1	died	directly.	
2	,,	in 10	minutes.
1	,,	in 15	,,
3	,,	in 20	,,
6	,,	in 30	,,
1	,,	in 45	,,
5	,,	in 1	hour.

6	died	in	$1\frac{1}{4}$ to $1\frac{3}{4}$	hours.
3	„	in	2 to $2\frac{1}{2}$	„
2	„	in	$3\frac{1}{2}$	„
1	„	in	5	„
4	„	in	6	„

Now although it would appear from the cases recorded, that death is occasionally delayed to as long as six hours, yet I am unable to find any recorded instance in which the first appearance of the symptoms was delayed to such an extent as in the five cases here described. All died within a few minutes of each other, and each a few minutes after first displaying strychnia-poisoning symptoms. The actual times of death are unfortunately not ascertainable, as there is no more reliable evidence to be obtained than the information derived from the relatives of the deceased persons, but this much is known, *viz.*, that the first appearance of the symptoms occurred in each not more than fifteen minutes before death, and as the deaths are stated to have occurred between 12 and 2 A.M., the first appearance of symptoms must have occurred between 11·45 P.M. and 1·45 A.M., the average being probably about $4\frac{1}{2}$ to 5 hours after the ingestion of the poison.

From further enquiries, I discovered, what did not appear in evidence at the trial, *viz.*, that all the victims took tea very shortly after their meal. Mahomedans in Bombay drink tea which has been made by boiling the leaves for some time, and which consequently contains a large quantity of tannin. Tannic acid produces an extremely insoluble precipitate with strychnia, and this, with a full meal, would naturally remain unabsorbed for a considerable period: it would also account for the absence of symptoms until shortly before death. Further, from experiments made upon several dogs, I found that strychnia, given after a full meal and rapidly followed by a dose of strong tea, was delayed in its effect, for a varying period of from $1\frac{1}{2}$ to three hours and, taking into consideration the impossibility of equalising the conditions in the dog and human being, this may be fairly taken to represent what took place in the five victims.

Again, it is to be observed that none of the victims were heard to complain of any bitter taste in their food, but as the sense of taste of natives of India is, to a certain extent, dulled by the habit of betel chewing, the bitter taste might have escaped detection. The method of introduction of the poison into the food is here worthy of notice. It was thrown upon the top of the milk, and probably swallowed at the first mouthful with all the remaining food to follow and cover the taste.

The symptoms seem to have developed in each case suddenly, the shock of hearing of the death or sickness of one, having, as it were, started the symptoms in another; all displayed typical muscular contractions, as far as can be ascertained from the description of those who saw them die, and all complained of pain in the abdomen, and thirst.

A medical practitioner of Bombay, who was engaged by the defence, endeavoured to prove that nux vomica was the poison used, and not strychnia. The proof of this would, of course, result in an acquittal of Buchoo, as there would then be no case against him (he having been proved to have bought "strychnia"). No attempt was made to prove that the deceased did not die of poisoning by strychnia, but it was argued that the poison must have been in the form of nux vomica.—Firstly, because the taste was not observed, and secondly, because the action was delayed too long for strychnia to have been administered; at any rate, at the time when it was stated by the cook to have been given. Now, with regard to the first objection, this medical witness stated that he had made trials of nux vomica and strychnia powders in milk, and that the taste of the latter was almost immediately observed in the milk, whereas the taste of the nux vomica was not noticed for some time.

With the assistance of Surgeon L. F. Childe, Second Physician to the Jamsetji Jejeebhoy Hospital, I made similar experiments, and we were both quite satisfied that the bitter taste of nux vomica, strangely enough, was much more noticeable than that of strychnia immersed in the milk for the same period. Further, it was observed that the nux vomica

powder placed on the surface of the milk was very apparent, and when stirred up formed balls or masses of brown powder, moist on the surface, and not readily breaking up or sinking, and these would hardly have escaped the notice of the persons partaking of the poisoned food had nux vomica been the poison used. Strychnia, on the other hand, lay on the surface and was barely visible, and on stirring, immediately disappeared. Moreover, the average quantity of nux vomica powder needed to produce a fatal result is 20 grains, and this quantity weighed out is considerable, and not at all easy to disguise, whereas 4 or 5 grains of strychnia powder (it was proved that only 23 grains were used altogether for the five persons) form a very small quantity and not easy to see on the surface of the milk. I may add that these quantities (20 grains and 4 grains of the respective powders) were used by me, when experimenting upon the relative bitterness of taste referred to above.

It will be seen on reference to the analysis of the viscera that the tests for brucia gave no indications of its presence. Now, if one could rely upon a single colour test for brucia in extracts derived from organic mixtures this alone would have been sufficient to disprove the nux vomica theory; but as I do not consider that an expert is justified in relying upon colour test only when grave issues may be dependent upon his dictum, I gave my opinion in this case that it could not be absolutely proved that brucia was absent, and this of course was tantamount to acknowledging the possibility, from a chemical point of view, of nux vomica being the poison used, though, from the surrounding circumstances, it was practically certain that strychnia, pure and simple, had been given to the victims. Further distinctive reactions of brucia are much to be desired, and in a case, such as the present, would have completely proved, as the termination of the case shows, the absence of brucia in the viscera of the deceased persons.

The evidence went to show that the motive for the destruction of all these people was the want of money on the part of Buchoo. It appears that he received from his father, who

was a wealthy man, a definite, though somewhat scanty allowance which, however, proved altogether inadequate to his wants. Finding it useless to apply to his father for more, he ran into debt. This had been going on for some time and his creditors had begun to press for repayment of various sums advanced by them to Buchoo. Finally, finding himself in difficulties, he determined to poison all his relatives who stood between himself and the acquisition of wealth, and purchased from a vendor of medicines 23 grains of strychnia. The bottle from which the strychnia was taken was afterwards recovered from the place where the vendor had hidden it, in fear of the consequences when the news of the deaths came to his hearing. The strychnia was divided into five parts and given to Dawood, the cook, who turned "Queen's evidence" on the promise of a free pardon. Dawood stated that he had been promised a large sum of money by Buchoo if he would carry out his design successfully, and to this end he placed a powder in the cup containing the milk for four of the victims and another in the cup containing the curd curry prepared for the fifth victim.

The business-like way in which the details of this case were brought to light, reflects the greatest credit upon the Bombay police force.

Note on some Compounds of the Oxides of Silver and Lead.

By Prabhakar Ramkrishna Bhandarkar, B. A., L. M. & S., Tutor in Chemistry and Medical Jurisprudence, Grant Medical College.

My attention was directed to the yellow precipitate obtained by the addition of caustic potash to solution of a lead and silver salt, by Miss Aston's note in the Journal of the Chemical Society, No. CCCXLIX (December 1891).

According to Wöhler this precipitate is a compound of silver oxide and lead oxide having the formula Ag_2O. 2PbO; but Miss Aston's experiments show that "under the conditions given by Wöhler, the substance formed varies in composition." The present note is the outcome of experiments made to verify Miss Aston's results.

Preliminary experiments showed that when the yellow precipitate is agitated with a very strong solution of caustic potash, the latter dissolves out a very small quantity of lead oxide; a moderately strong solution has hardly any action. When the precipitate is boiled with successive quantities of a very strong solution of caustic potash, lead oxide is dissolved out more rapidly, the precipitate soon becoming green and ultimately black.

The solutions used in the following experiments were :—

(1). A solution of silver nitrate of the strength of 34 grammes to 10 ounces of distilled water; (2) a solution of lead nitrate, 33 grammes to 10 ounces; and (3) a solution of caustic potash, 12 ounces to 120 ounces. Equal volumes of solutions (1) and (2) contain silver oxide and lead oxide nearly in the proportion of the molecular weights of the oxides.

An experiment was made by gradually adding a mixture of one ounce of solution (1) and two ounces of solution (2) to twenty ounces of solution (3). A yellow precipitate was

produced which, on analysis, gave results that showed its composition to be very nearly $Ag_2O.PbO$, and not $Ag_2O.2PbO$, as given by Wöhler. It was therefore thought advisable to see if the order of adding the solution made any difference. Parallel experiments were made: in one, a mixture of lead and silver salts was added to caustic potash solution, and in the other, the caustic potash solution was added to the mixture or the salts.

When silver nitrate was added to a solution of lead nitrate dissolved in an excess of caustic potash, the precipitate was at first brown, but after some time became partly yellow. It was not, however, uniform in colour, some particles being brown and others yellow. This method was consequently not adopted.

The following are the details of the experiments:—

Experiment 1.—A mixture of one ounce of solution (1) and two ounces of solution (2) was gradually stirred into ten ounces of solution (3). The precipitate was washed with water until sulphuretted hydrogen ceased to blacken the washings.

Experiment 2.—The quantities of the solutions and the treatment of the precipitate were the same as in Experiment 1, but the caustic potash solution was added to the other two solutions previously mixed.

Experiment 3.—The quantities and procedure the same as in Experiment 1, but the precipitate was agitated with sucessive quantities of caustic potash solution (Solution 3) until the decanted solution, after filtering, barely gave a tinge with sulphuretted hydrogen.

Experiment 4.—The quantities and procedure the same as in Experiment 2, but the precipitate was agitated with caustic potash solution as in Experiment 3.

Experiment 5.—A mixture of one ounce of solution (1) and three ounces of solution (2) was gradually stirred into 15 ounces of solution (3). The precipitate was washed with water until the washings ceased to blacken on the addition of sulphuretted hydrogen.

Experiment 6.—The quantities of the solutions and the treatment of the precipitate the same as in Experiment 5, but

the caustic potash solution was added to the other solution previously mixed.

Experiment 7.—Twenty ounces of solution (3) were added to a mixture of one ounce of solution (1) and three ounces of solution (3). The precipitate was agitated with successive quantities of solution (3), until the washings after filtering were no longer blackened by sulphuretted hydrogen. This experiment was performed because the results of Experiment 4 were slightly vitiated by the loss of a small quantity of lead sulphate in the process of analysis, while it was suspected that the precipitate of Experiment 5 contained some free lead hydroxide which could be removed by washing with caustic potash solution.

Experiment 8.—Thirty-two ounces of a five per cent. solution of caustic potash were added to a mixture of one ounce of solution (1) and three ounces of solution (2), and the precipitate washed with water until the washings were no longer alkaline. This experiment was performed to see if Wöhler's compound could be formed by using a more dilute solution of caustic potash than hitherto employed. Washing with caustic potash solution was not resorted to for the same reason.

Experiment 9.—The yellow precipitate of the oxides was boiled with successive quantities of a very strong solution of caustic potash until the latter could no longer dissolve out lead oxide: the black residue thus obtained was then analysed.

It will be observed that the quantity of caustic potash solution used in each experiment, was more than sufficient to precipitate the whole of the silver solution and to keep the whole of lead dissolved, if such action could take place.

Almost the whole of the washed precipitate was dissolved in nitric acid and the solution filtered. The silver and lead in the filtrate were then respectively estimated as chloride and sulphate.

The following is a tabular statement of the results :—

Number of Experiment.	Silver chloride in grammes.	Lead Sulphate in grammes.	Found Ag_2O.	Ag_2O calculated for formula.
			Per cent.	
1	2·665	2·892	50·31	
2	2·553	2·749	50·50	
3	2·139	2·297	50·57	50·98 per cent. Ag_2O, PbO.
4	1·921	1·985	51·53	
5	2·669	2·945	49·89	
6	2·647	2·898	50·09	
7	1·413	1·504	50·79	
8	2·572	2·876	49·56	
9	0·470	0·239	68·36	67·53 per cent. 2 Ag_2O, PbO.

These results show that the yellow precipitate produced by the addition of an excess of caustic potash solution to a mixture of solution of silver nitrate and lead nitrate, provided the quantity of lead nitrate is not too small, is a definite chemical compound having the formula Ag_2O. PbO. It would further appear to be impossible to obtain a compound having the composition of Ag_2O. 2PbO. under the conditions given by Wöhler.* The black residue left behind, when the yellow compound is boiled with successive quantities of strong solution of caustic potash, has very nearly the composition $2Ag_2O$. PbO, as pointed out by Miss Aston.

If the yellow compound be exposed to sunlight, it blackens. After the change is complete, I find that the compound, unlike the yellow one, easily gives up a portion of its lead oxide when agitated with a solution of caustic potash. The residue has nearly the composition of $2Ag_2O$. PbO, but at the same time some metallic silver or argentous oxide (Ag_4O.) seems to be formed. I have, however, not yet finished my experiments in this direction.

* I could not obtain *Poggendorff* for 1837 and my knowledge of Wöhler's experiments is derived from Miss Aston's note and Watts' Dictionary of Chemistry.

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